Computer Magazine of the Year

POPULAR Computing WEEKLY

35p

26 April-2 May 1984 Vol 3 No 17

BRITAIN'S BEST-SELLING MICRO WEEKLY

Hobbit competition — p.43

News Desk

New imprint to foil the pirates

LATEST in the line of software protection devices is Imprint 2 from A & F Software.

Imprint 2 has been developed from a system copyrighted by Jim Lamont in 1978. It was a later anti-piracy device of his that was seized by the MoD earlier this year.

The device is incorporated into the program in two stages; the first during the actual writing and the second at the duplication stage. Anyone who makes a copy of a protected program will find that it crashes while loading.

"We are 99 per cent certain that people won't be able to get round this device," said Mike Fitzgerald of A & F. "A lot of people are going to try very hard to do so, but they'll find it extremely difficult."

Jim Lamont has successfully applied for a patent for Imprint 2.

A & F is not the only company to be developing his idea, but it is the first to produce a completed version.

"A number of software houses are interested in our version," Mike Fitzgerald con-

continued on page 5 ▶

Relative details from Einstein

TATUNG has now announced full details of its new micro — the Einstein — planned to be available in July.

Aimed at both the home and small business markets, the Einstein is priced at £499. The machine is Z80A-based, has 64K Ram plus 16K video Ram and an 8K Rom (expandible up to 32K). This is broadly the MSX hardware standard.

The Einstein also includes a single built-in 3 inch Teac disc drive. The unit has a formatted capacity of 400K (200K per side). Just over 43K is available from Basic after it has been loaded from disc.

It has a professional keyboard. Display is either 40 or 32 by 24 columns in text mode and 256 x 192 pixels in graphics mode. The machine has 16 colours with a colour resolution of any two colours per 8-pixel row. Up to 32 sprites can be displayed. A three channel sound chip is included.

The machine has a Centronics port, an RS232, twin analogue ports, an 8-bit user port and YUV and UHF tv connections.

Up to three additional disc units can be connected (the

continued on page 5 ▶



This Week

CLASSIFIEDS START HERE

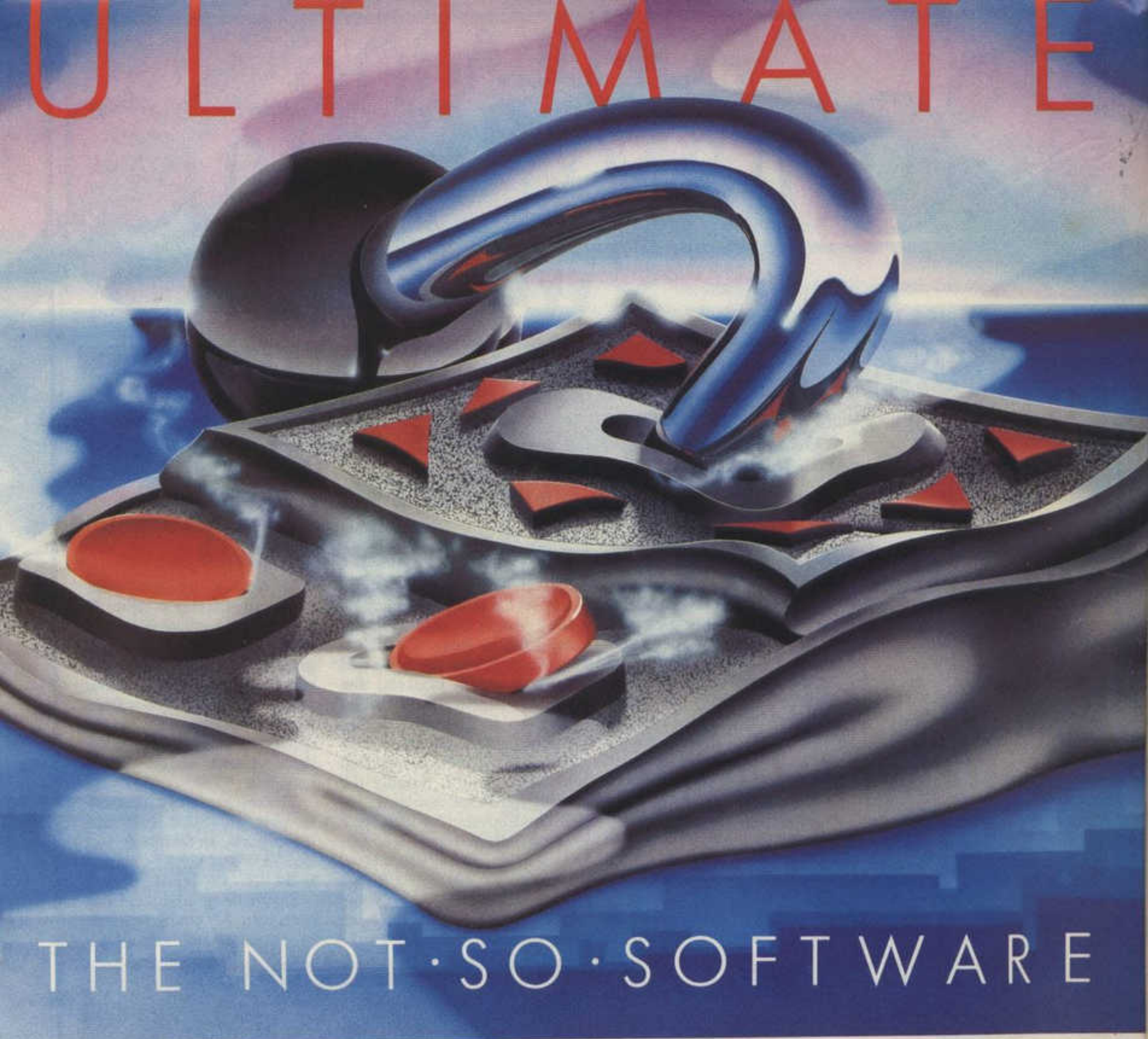
Computer Swap
01-437 4343

Free readers entries to buy or sell a computer. Ring 01-437 4343 and give us the details.

SWAP 40 Channel CB radio with ariel and books worth £60 for Commodore 64. Software (inc. Hobbit) Plus Joystick, phone Bargoed 821 087 after 5pm.

URGENT SWAP Commodore 64 + software for your CBM Pet. Tel: Brierley Hill 72374.

STAR GAME
Ye Olde Castle on BBC B
See page 10



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SUNSHINE

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How to submit articles

Articles which are submitted for publication should not be more than 3,000 words long. The articles, and any accompanying programs, should be original. It is breaking the law of copyright to copy programs out of other magazines and submit them here — so please do not be tempted.

Accuracy

Popular Computing Weekly cannot accept any responsibility for any errors in programs we publish, although we will always try our best to make sure programs work.

This Week

Editorial

The Hobbit is undoubtedly a classic micro adventure game. Indeed, there is almost a danger that so many people have sung its praises that users are starting to become slightly bored with it.

However, *The Hobbit* still remains a landmark in computer history for the way in which it brought together elements of artificial intelligence, graphics and interaction to produce an adventure which captured a good deal of the flavour and imagery of the original book on which it was based. The game may look a bit dated now, compared to some of the adventures which are coming on to the market, but at the time it was released it was a long way ahead of anything else.

A lot of the praise for this program is due to Fred Milgrom and his team of Melbourne House programmers. But, praise is also due to Tolkein, for without his book there would be no program.

The explosion in home micros, and the accompanying software expertise that has grown up around it, has made it possible for all manner of worlds to be brought alive in your own living room. But, the nature of those worlds still depends on those with the imagination and skill to conceive them.

With programs such as *The Quill* and *Games Designer* starting to emerge, the importance of original thinkers is likely to grow.

Next Thursday

Play Solitaire — next week's star game for Dragon 32 by J Bateman — the game that is usually played with pegs or marbles.

QL non-appearance explained

THE reason for the spectacular non-appearance of the Sinclair QL has now been made clear.

Soon after its January launch it became obvious to Sinclair's design team that the on-board operating system, SuperBasic and QDOS disc operating system software was not going to fit into the 32K Rom allocated for it in the hardware design.

In addition, Sinclair decided to further extend the software to include extra facilities such as turtle graphics.

With too much machine-code to squeeze into the Rom, Sinclair has decided to put a portion of it on to a separate chip.

First machines — which Sinclair has now promised will be in the hands of customers by the end of this month — will go out with the 'overflow' software provided as a separate Eprom board which will have to be plugged into the Rom cartridge port at the rear of the machine.



Later versions of the machine will have the software built into the main Rom, incorporated inside the computer, freeing the Rom cartridge port for the purpose for which it was intended.

People who receive the plug-in Eprom version of the QL will be offered a hardware up-grade later — well before Rom cartridge software appears for the machine.

Because the QL design has a fixed 64K Rom address space, the larger-than-32K internal Rom will mean that the maximum size of cartridge software will be only 16K.



Explaining the decision to deliver first machines with a sideways Eprom board, Sinclair's spokesman said: "As far as customers are concerned, they want the machine they thought they were buying as soon as possible — and this is a way of doing that."

Sinclair now has over 13,000 waiting customers — four thousand more than at the end of February.

The form of compensation to be offered to waiting customers has also been sorted out. Each waiting QL customer — regardless of whether they have ordered by cheque or credit card — will receive an RS232 printer lead which retails at £14.95. Those who originally ordered a printer lead will get a refund.

● *PCW*'s QL order: Week 14. Delivery is now scheduled for the end of April.

Einstein

◂ continued from page 1

first costs £190) and an optional colour display will be priced around £240.

No details are available so far of which chains will stock the machine.

Although the micro's Tatung/Xtal disc operating system is claimed to be CP/M compatible, being a 40-column only machine the Einstein will only work with software written for a 40-column display. A+F, Crystal and IJK are writing a limited amount of games software for the machine but it will not be cheap, necessarily including the cost of a disc.

The Einstein has been designed entirely by Tatung in the UK and will be manufactured at the company's Bridgenorth plant. Tatung is Taiwan's largest company with a turnover last year of over £500m.

New imprint

◂ continued from page 1

tinued. "As yet, we have not decided whether to supply houses with the complete system, or whether to manufacture a 'master' package which they can use to package which they can use to protect programs, without actually discovering the method.

"There are only four people — the developers themselves — who do know how it works."

A & F's first program with the incorporated imprint will be *Haunted Abbey* for the BBC, available in two to three weeks time. It will cost £6.90, as opposed to A & F's usual price of £7.90, in anticipation of increased sales. Chuckie Egg for the Commodore 64 should follow shortly afterward, and all A & F's future programs will contain Imprint 2.

Low-cost modem from Protek

PROTEK has announced a new low-cost modem for home computers.

The device — an acoustic modem — connects to any machine with an RS232 interface and transmits information at a choice of speeds — 1200/1200 or 1200/75 baud.

The unit is battery powered and will operate for a 40-hour period on one set of four 1.5 volt batteries.

The modem should be available some time in June, priced at £59.55.

Details from Protek, 1A Young Square, Brucefield Industrial Park, Livingstone, West Lothian.

Advanced filing

MELBOURNE House has announced *Acos+*, an advanced cassette filing system for the Commodore 64.

It sets up an on-screen directory at the start of any cassette showing on screen the programs on the tape.

Using the system the name of any program Saved to tape is automatically recorded in the directory at the start of the cassette.

The list of programs on the tape can then be viewed when the cassette is loaded and a

One missing satellite

UOSAT-2, the satellite built and launched by engineers at Surrey University, appears to have gone missing.

The satellite went into space on March 1, made three orbits and then stopped transmitting.

The Surrey University group do not know what has happened to the satellite, but believe it is still orbiting the earth at the correct altitude.

They have asked technicians at Stanford University, California, to blast high-power radio waves at the satellite in an effort to galanise possible electrical faults. Stanford's transmitter is 1,000 times more powerful than Surrey's own.

Prize money up for grabs

A $5000 prize is still up for grabs following international chess master David Levy's latest win.

In 1968, David Levy made a bet that no computer would be able to beat him at chess within 10 years. In 1978, he extended the time limit, having successfully fought off all challenges and his $5000 still intact.

Last week, he played against the Cray MSC computer, reckoned to be one of the most powerful in the world.

After a two day match over four games, he won by four games to nil. The match, held at Brunel University, was sponsored by GEC/Dragon, along with a two day seminar on Artificial Intelligence organised by Queen Mary College.



David's company, Intelligent Software, designed the forthcoming Enterprise (née Flan, Elan, etc), computers.

11th microfair at Ally Pally

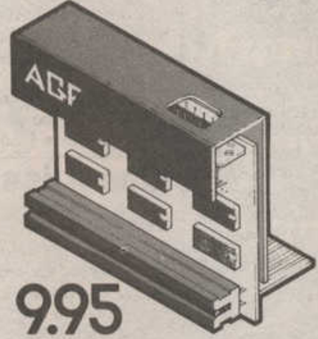
THE 11th ZX Microfair takes place at Alexandra Palace on Saturday, April 28th.

The Alexandra Pavilion will be open for the show from 10am to 6pm and entry will cost £1 and 50p.

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The new QuickShot II has improved styling with a trigger type firing control as well as the top firing action and a broader base for greater suction stability. The rapid fire switch, which allows a continuous stream of shells where normally a button press is required for each one, is located in the base for easy access in use.

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8.95



QuickShot

QuickShot II



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	QUICKSHOT II JOYSTICK	11.95	
ONE	DISCOUNT VOUCHER IF ORDER EXCEEDS £18	FREE	
	ZX81 ☐ ZX SPECTRUM ☐ Please tick	FINAL TOTAL	

Letters

No licence required

Re *Popular Computing Weekly* 12-18 April, 1984, News Desk. I was most interested to read the snippet on 'tv licence case dismissed'.

I purchased a Commodore 64 in mid October, 1983. My tv is black and white and I hold a monochrome licence. However, I needed a dedicated colour tv for the computer, so I purchased a 14" colour tv at the same time. As expected, the shop notified the tv licence Records Office of the purchase and I received a month later a notice requiring me to obtain a colour licence.

I wrote to the Records Office emphasising my job in a legal department and explaining the purpose of the colour tv. I went to great lengths to set out the relevant provisions of the Wireless Telegraphy Act 1949 ss 1(1) and 19(1), and stating my opinion that, providing the tv was not used to receive broadcasts, a licence was not required.

On 28 November, 1983, I received a reply from the Records Office stating:

'In view of the circumstances you describe, it will not be necessary for you to obtain a television licence. I have amended our records accordingly.'

The report of Peter Battle's case is undated, but I wonder if my correspondence with the Record Office preceded it? If so, why did the Records Office prosecute Peter Battle at all?

JE Lawrence
Manchester

Cracked Hobbit

Hooray, Hooray, I've done it. What a relief. I actually cracked *The Hobbit*. After two months toil I obtained 77.5%.

I couldn't have done it without the fantastic help I received from Melbourne House. I can't praise them enough.

All I can say to them is thanks a lot and if anyone is as slow as I am, then they should get Melbourne House's new book *A Guide to Playing The Hobbit*. At £3.95 it's well worth it. Even for those who have cracked it, it's worth getting. It just shows what a challenge *The Hobbit* can be.

Well done Melbourne House. Roll on your next two adventures.

John Westmacott
18 Wakefield Close
Ronkswood
Worcester WR5 1QR

For those of you interested in solving *The Hobbit* we have a competition on page 43.



More Vic 20 please

Is it possible for you to publish a series of utility programs for the 16K Vic 20 (or unexpanded)? There are many utilities that the machine could do with — for example, renumber, a machine-code monitor, and assembler disassembler, trace etc. I am sure a great many Vic 20 owners would be very grateful if such a series was organised.

After all, we don't all want to spend our time shooting down aliens, do we?

Stuart Lowbridge
84 Hall Lane
Walsall Wood
Walsall

Writers write

May I ask you if you would draw the attention of your readers to the meeting to be held at 1 o'clock in the afternoon on Saturday, May 5, at the Kenneth Moore Theatre, Oakfield Road, Ilford to discuss the formation of proposed Society of Software Authors.

The idea of this Society was put forward by the Computer Trades Association in their Annual General Meeting last year, when it was agreed that there was a need for a body to represent the interests of Software Authors. Although it is hoped that the new Society will affiliate to the Computer Trades Association, it is intended that it will be an independent Society.

Anybody who is interested in the writing of software for publication would be well advised to attend the meeting on May 5. If they wish to vote at the meeting they will have to pay an initial subscription of £10 to cover the costs of setting things up, but if they just wish to attend they are quite welcome to do so.

Should you require further information please contact the Acting Treasurer, Miss Dorene Cox, 7 Meadway Court, Whalebone Lane South, Dagenham, Essex. (tel: 01-593 8976) or myself (0530 812320).

Nigel Backhurst
General Secretary
Computer Trades Association

Where will it end?

I am writing to you in an attempt to persuade the huge number of computer users in Britain to raise their voices in protest at the proposed censorship of computer games. Although I would be the first to complain about the perversity in Artic's *Ship of Doom*, once the Mary Whitehouses of this world start censoring computer games, where will it end?

Will *The Hobbit* be banned because its graphic description of the fight scenes? Will the RSPCA ban *Pssst* for its cruelty to insects? And what of the wanton destruction of alien life forms — surely this must be banned along with all 'shoot 'em up' games?

I strongly urge that the computering public of this nation should stand up and tell the government where it can stick its censorship.

James Hickman (15)
27 Fallow Walk
Spring Park
Northampton

An international flavour

Our school computer club is interested in getting contacts in England, but of course, we couldn't afford to pay for a real advert, as we do not sell anything.

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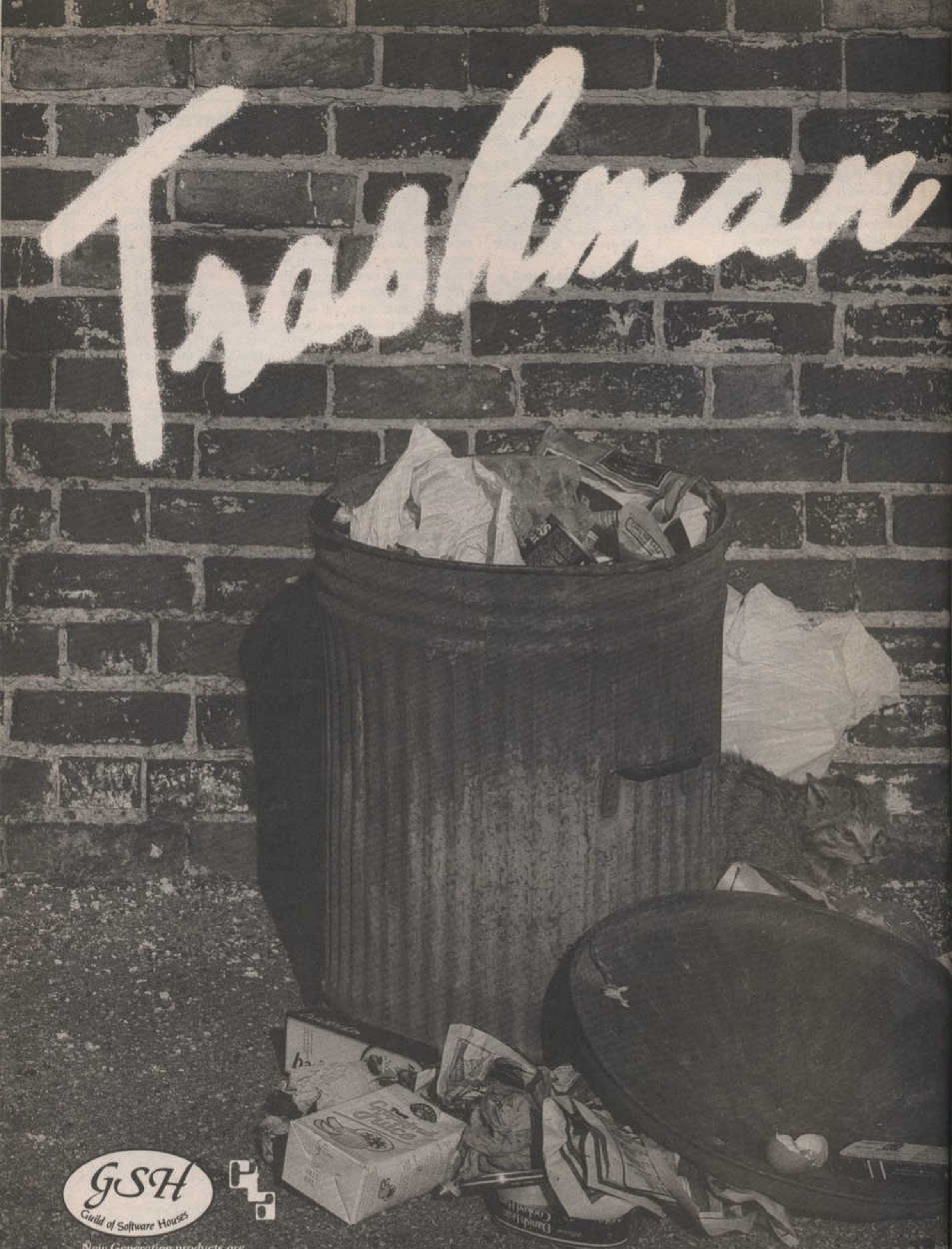


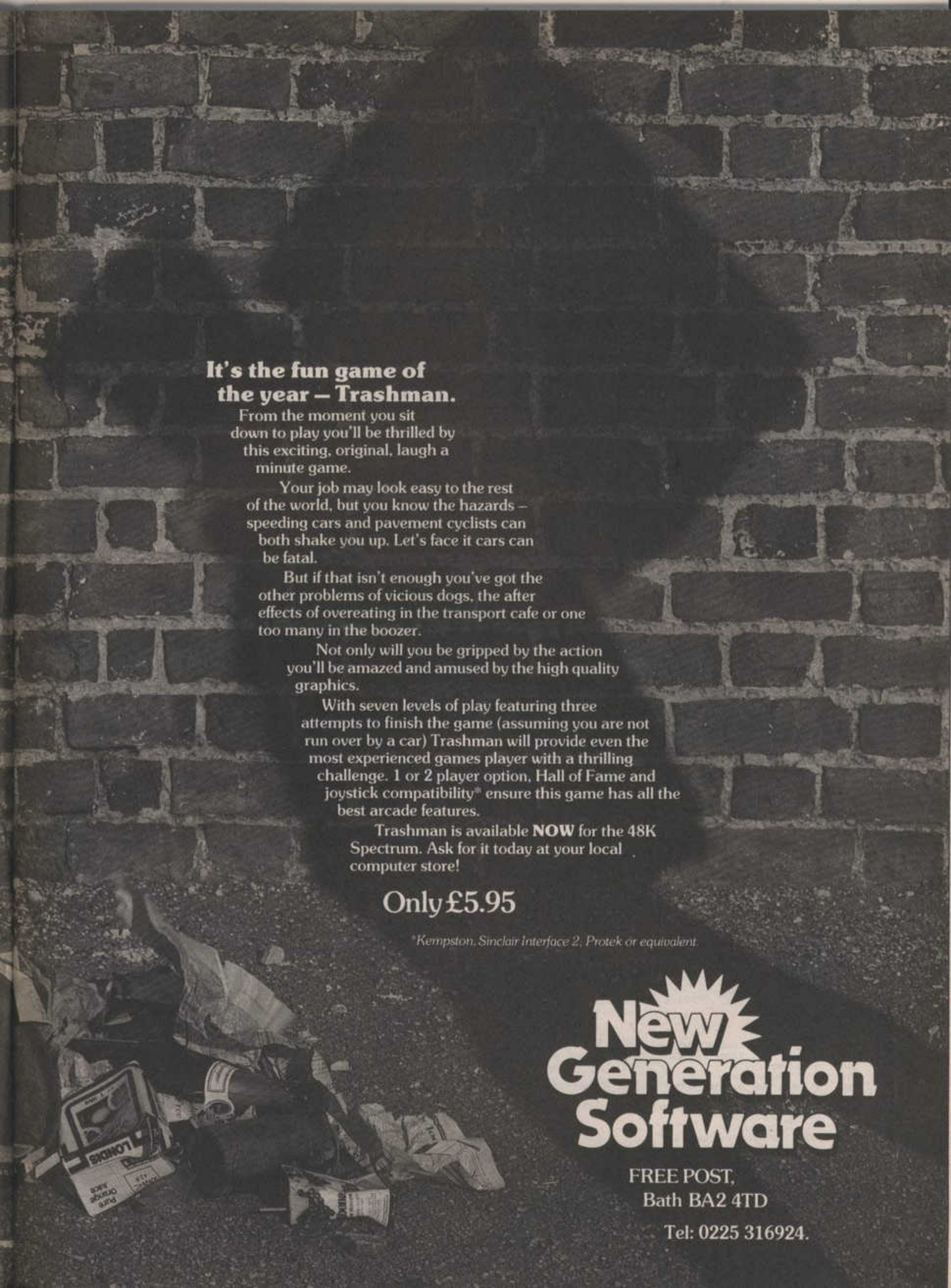
COMPUTE-A-FROG

WANT FRENCH PENPALS (AGE 11-15)
INTERESTED IN COMPUTING (VIC, 64, ZX, NEWBRAIN) TO EXCHANGE PROGRAMS ETC. ?

CONTACT : THE FRENCH CONNECTION
SECTION 'PATAMATIQUE
COLLEGE PIERRE DUBOIS
71 RUE VICTOR BOISSEL
53017 LAVAL, FRANCE

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Ye Olde Castle

A new game for the BBC B by Simon Pithers

This is a new and original program called 'Ye Olde Castle'. It has had a bit of it changed into Machine Code using *'&ffbc'* which is Acorn's non-vectored *Oswrch* call and is certainly faster than Basic and a little faster than the Vectored *Oswrch* (*&ffeee*). The machine code was used because the program would be just too slow and not worth playing at all if it were all in Basic. All program instructions are in the program. This game can probably be played on the Electron, although I do not know if the run time would be fast enough. There are gaps in the listing between each procedure, so that each routine is clearly distinct.

Procedures

PROCtitles: This is to put up the program title and play a tune
PROCinst: This is to put up the program instructions
PROC set-up: This is to set up variables, envelopes and screen
PROCset-screen: This is to draw the screen picture of a castle etc
PROCass 1: This is to assemble the machine code to draw the aliens' gun for fast movement
PROCass 2: This is to assemble the machine code to wipe out the aliens' gun
PROCpicend: This is to rerun or end the program
PROCexplode: This is to kill you when the energy is gone
PROCkill: This is to make guards come out and kill you
PROCend: This is to print your score and reincarnate the guard
PROCfire: This is to fire your gun




```
10 REM *************************
20 REM *                       *
30 REM *    Ye Olde Castle     *
40 REM *                       *
50 REM *    By S.C.Pithers     *
60 REM *                       *
70 REM *       (c)1984         *
80 REM *                       *
90 REM *************************
100 REM
110 MODE 7
120 PROCtitles
130 PROCinst
140 G%=4:E%=E%*10:?&85=G%
150 MODE 5
160 PROCset_up
170 TIME=0
180 VDU 23;8202;0;0;0;
190 ?&80=A1%:?&81=A1% DIV 256
200 CALL &D00
210 *FX 11,1
220 COLOUR1
230 REPEAT O%=RND(2)
240   IF O%=1  CALL &DA0:A%=A%+20:VDU5:GCOL0,2:MOVE A%,B%:VDU225,4
250   IF O%=2  CALL &DA0:A%=A%-20:VDU5:GCOL0,2:MOVE A%,B%:VDU224,4
260   IF A%<470 A%=470
270   IF A%>750 A%=750
280   IF INKEY(-98) A1%=A1%-8:?&80=A1%:?&81=A1% DIV256:CALL&D00
290   IF INKEY(-67) A1%=A1%+8:?&80=A1%:?&81=A1% DIV256:CALL&D00
300   IF INKEY(-74) E%=E%-1:W%=TIME:PROCfire(A1%):TIME=W%
310   IF A1%>840 A1%=840
320   IF A1%<450 A1%=450
330   PRINT TAB(0,1);"Energy=";E%;" "
340   PRINT TAB(0,2);"Time=";INT(TIME/100);" "
350   IF INT(TIME/100)>time% PROCkill
360   UNTIL FALSE
370 END
380
390
400 DEF PROCfire(F%)
410 GCOL 3,1
420 FOR X%=175 TO 765 STEP 80
430   MOVE A1%,175:DRAW A1%,X%
440   NEXT
450 FOR X%=175 TO 765 STEP 80
460   MOVE A1%,175:DRAW A1%,X%
470   NEXT
480 SOUND 1,2,50,5
490 IF POINT(A1%,760)=2 SOUND1,2,10,100:SOUND0,2,10,100:VDU5:
    MOVE A1%-30,760:? &85=(?&85)-1:PRINT"O":VDU4:PROCEND
500 IF E%<=0 PROCexplode
510 ENDPROC
520
530
540 DEF PROCASS1(SS)
550 P%=&D00
560 [OPT 0
570 LDA SS
580 LDX #00
590 .loop
600 STA &7A28,X
610 STA &7BE8,X
620 STA &7D68,X
630 INX:CPX #112:BNE loop
640 LDA #18:JSR &FFBC
650 LDA #00:JSR &FFBC
660 LDA #02:JSR &FFBC
670 LDA #25:JSR &FFBC
680 LDA #04:JSR &FFBC
690 LDA #90:JSR &FFBC
700 LDA #02:JSR &FFBC
710 LDA #100:JSR &FFBC
720 LDA #00:JSR &FFBC
730 LDA #25:JSR &FFBC
740 LDA #04:JSR &FFBC
750 LDA #170:JSR &FFBC
760 LDA #02:JSR &FFBC
770 LDA #100:JSR &FFBC
780 LDA #00:JSR &FFBC
790 LDA #25:JSR &FFBC
800 LDA #85:JSR &FFBC
810 LDA &80:JSR &FFBC
820 LDA &81:JSR &FFBC
```

```
830 LDA #175:JSR &FFBC
840 LDA #00:JSR &FFBC
850 RTS
860 ]
870 ENDPROC
880
890
900 DEF PROCASS2(DD)
910 P%=&DA0
920 [OPT 0
930 LDA DD
940 LDX #00
950 .loop1
960 STA &6260,X
970 INX:CPX #140
980 BNE loop1
990 RTS
1000 ]
1010 ENDPROC
1020
1030
1040 DEF PROCEND
1050 FOR X%=255 TO 1 STEP-8
1060   SOUND 1,-15,X%,1
1070   SOUND 2,1,X%,1
1080   SOUND 3,2,X%,1
1090   SOUND 0,0,0,0
1100   NEXT
1110 IF ?&85<=1 S=10000-TIME:SC=SC+S:PRINTTAB(1,5);"Score="
     ;SC:GL=GL+1:?&85=GL: E%=20:A=640:K=GET:GOTO170
1120 *FX 15,0
1130 ENDPROC
1140
1150
1160 *FX 11,0
1170 VDU 19,0,0;0;:GCOL 0,0
1180 FOR X%=1 TO 512 STEP 4
1190   MOVE 0,X%:DRAW 1280,X%
1200   MOVE 0,1024-X%:DRAW 1280,1024-X%
1210   NEXT
1220 CLS
1230 PROCPICEND
1240
1250
1260 DEF PROCkill
1270 FOR X%=1 TO 6:COLOUR3
1280   PRINT TAB(X%,28);CHR#225
1290   PRINT TAB(X%-1,28);" ";
1300   PRINT TAB(19-X%,28);CHR#224
1310   PRINT TAB(20-X%,28);" ";
1320   FORD=1 TO 250:NEXT
1330   SOUND 1,-15,X%*10,2
1340   NEXT
1350 FOR X%=1 TO 10
1360   SOUND 1,3,X%,2
1370   NEXT
1380 FOR D=1 TO 500:NEXT
1390 FOR X%=1 TO 20
1400   PROCASS1(X%):CALL &D00
1410   NEXT
1420 SOUND 3,3,100,200
1430 GOTO 1160
1440 ENDPROC
1450
1460
1470 DEF PROCset_screen
1480 VDU 19,1,2;0;
1490 VDU 19,2,4;0;
1500 VDU 19,3,3;0;
1510 VDU 19,4,6;0;
1520 GCOL 0,1
1530 MOVE 1280,0:MOVE 1280,250:PLOT 85,640,0
1540 MOVE 640,300:PLOT 85,1280,250:MOVE 0,0
1550 MOVE 0,250:PLOT 85,640,0:MOVE 640,300:PLOT 85,0,250
1560 GCOL 0,2
1570 MOVE 500,250:MOVE 810,250:PLOT 85,810,700
1580 MOVE 500,700:PLOT 85,500,250
1590 FOR X%=500 TO 780 STEP 70
1600   MOVE X%,700:MOVE X%,725:PLOT 85,X%+35,725
1610   MOVE X%+35,700:PLOT 85,X%,700
1620   NEXT
1630 GCOL0,3
1640 MOVE 610,250:MOVE 710,250:PLOT 85,300,0
1650 MOVE 0,0:PLOT 85,610,250
1660 MOVE 710,250:PLOT 85,1280,0
1670 MOVE 980,0:PLOT 85,610,250
1680 MOVE 610,250:MOVE 710,250:PLOT 85,710,400
1690 MOVE 610,400:PLOT 85,610,250
1700 MOVE 640,400:MOVE 640,400:MOVE 640,400
1710 FOR X%=1 TO 180 STEP 8
1720   B=PI*X%/180:MOVE 640,400
1730   PLOT 85,50*COS(B)+660,50*SIN(B)+400
1740   NEXT
1750 MOVE 1100,940:MOVE 1100,940
1760 FOR X%=1 TO 365 STEP 8
1770   B=PI*X%/180
1780   MOVE 1100,940
1790   PLOT 85,70*COS(B)+1100,70*SIN(B)+940
1800   NEXT
1810 GCOL 0,1
1820 MOVE 680,310:MOVE 690,310:PLOT 85,690,320
1830 MOVE 680,320
1840 PLOT 85,680,310
1850 GCOL 0,2
1860 MOVE 610,250:DRAW 710,250
1870 VDU 23,224,24,60,24,248,24,56,72,136
1880 VDU 23,225,24,60,24,31,24,28,18,17
1890 ENDPROC
1900
1910
1920 DEF PROCset_up
1930 PROCset_screen
1940 PROCASS1(31)
1950 PROCASS2(30)
1960 ENVELOPE 1,1,0,2,4,10,20,20,100,10,0,10,120,120
1970 ENVELOPE 2,1,4,2,0,10,20,20,10,0,10,100,120,120
1980 ENVELOPE 3,1,1,2,3,4,5,6,100,10,0,10,126,126
1990 A%=640:B%=765:A1%=640:time%=E%*3:SC=0
2000 ENDPROC
2010
2020
2030 DEF PROCexplode
2040 PRINT TAB(0,5)"Energy Gone !!!"
2050 *FX 9,1
2060 *FX 10,1
2070 *FX 15,0
2080 VDU 19,0,14;0;
2090 FOR X%=255 TO 1 STEP -4
2100   GCOL 3,RND(3)
2110   SOUND 1,2,X%,2
2120   SOUND 2,2,X%,1
2130   SOUND 3,2,X%,3
2140   MOVE 1100,940
2150   DRAW RND(300)+440,100+RND(75)
2160   PROCASS1(RND(255)):CALL&D00
2170   NEXT
2180 GOTO 1160
2190 ENDPROC
2200
2210
2220 DEF PROCPICEND
2230 VDU4:CLS
2240 MOVE 20,20:DRAW 1260,20
2250 DRAW 1260,1004:DRAW 20,1004:DRAW 20,20
2260 COLOUR 3
2270 *FX 15,1
2280 PRINT TAB(4);"Score=";SC''
2290 PRINT TAB(4,5);"End of Game."
2300 PRINT TAB(4,7);"Press 'R' to"
2310 PRINT TAB(4,9);"rerun, or any"
2320 PRINT TAB(4,11);"other key to"
2330 PRINT TAB(4,13);"   END...!"
2340 INPUT TAB(4,15)">>",A#
2350 IF A#="R" THEN CLEAR:RUN
2360 CLS
2370 PRINT''"     BYE.....!"
2380 END
2390 ENDPROC
2400
2410
2420 DEF PROCinst
2430 CLS
2440 PRINT TAB(12,1);CHR#141+CHR#134+"Castle"
2450 PRINT TAB(12,2);CHR#141+CHR#134+"Castle"
2460 PRINT
2470 PRINT" This game is set in ye olden days"
2480 PRINT" when dragon slayers slayed dragons"
2490 PRINT" and helpless young maidens got into"
2500 PRINT" distress."
2510 PRINT
2520 PRINT" Well as you guessed you are a friendly"
2530 PRINT" alien who lands at the guarded"
2540 PRINT" castle and you have to hit its guard"
2550 PRINT" 3 times to set the damsel free."
2560 PRINT" But the guard is'reincarnated"
2570 PRINT" and you have to kill again."
2580 PRINT
2590 PRINT" Your Contols are:"
2600 PRINT" Z=left  X=right  'RETURN' to fire."
2610 PRINT
2620 PRINT" So good luck and may god have mercy on"
2630 PRINT" your soul............."
2640 PRINT
2650 PRINT TAB(9);CHR#157+CHR#129+"PRESS ANY KEY  "+CHR#156
2660 A=GET
2670 CLS
2680 PRINT TAB(13,7);CHR#141+CHR#134+"Castle"
2690 PRINT TAB(13,8);CHR#141+CHR#134+"Castle"
2700 INPUT TAB(3,13)"Enter a Level 1-4 (4=Easy) ",EX
2710 IF EX<1 OR EX>4 THEN 2670
2720 ENDPROC
2730
2740
2750 DEF PROCtitles
2760 ENVELOPE 6,1,0,0,0,0,0,0,100,10,0,10,120,100
2770 PRINT''''
2780 PRINT TAB(13,7);CHR#141+CHR#134+"Castle"
2790 PRINT TAB(13,8);CHR#141+CHR#134+"Castle"
2800 PRINT'''''
2810 REPEAT
2820   READ A,B,C,D
2830   IF A=999 THEN 2860
2840   SOUND 1,6,A,B/1.5
2850   SOUND 2,6,C,D/1.5
2860   UNTIL A=999
2870 SOUND 1,0,0,0:SOUND 2,0,0,0
2880 PRINTTAB(10);CHR#157+CHR#129+"PRESS A KEY  "+CHR#156
2890 A=GET
2900 ENDPROC
2910
2920
2930 DATA 129,6,145,6,137,6,149,6
2940 DATA 145,7,157,7,153,5,141,5
2950 DATA 145,7,157,7,137,5,149,5
2960 DATA 145,7,157,7,137,5,149,5
2970 DATA 145,25,157,25
2980 DATA 165,7,149,7,149,5,133,5
2990 DATA 149,25,137,25,157,7,145,7
3000 DATA 121,5,137,5,129,20,145,20
3010 DATA 999,999,999,999
```

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Street Life

The games baron

***Graham Taylor** talks to Francis Baron, managing director of W H Smith's cable services division*

If W H Smiths has its way in the next few years, the idea of renting a computer will be no more unusual than that of renting a television. Not only that, but you won't buy games any more — you'll simply download them, choosing your favourite from a menu.

The modus operandi for these changes is the introduction of a cable network specifically for games. Initially, they will be available through most of the 11 new cable franchises due to begin operations in early 1985 (See *Popular Computing Weekly* 12-18 April for the full list).

The man behind the operation is Francis Baron who stresses that the possibilities of the system do not end with *Space Invaders*. "We're looking at something for the whole family, although obviously the initial demand is likely to come from games players. In fact, people will be able to word process, do accounts, do their shopping and eventually interact with other players on other machines to play complex games.

"The computing technology for the system has been available for a while, but the existing cable networks proved unsuitable. Licences on the old systems only last two years. Any cable operator who takes our system will be supplied with some expensive hardware — obviously we're looking for more than two years of commitment."



The other problems with the old systems are technical. "Most of the existing systems use the HF standard, but for the kind of things we have in mind we use a VHS/VHF delivery system. In addition, most of the old systems only have four channel capacity — obviously they're all going to be used up."

The hardware the subscriber receives is an impressive looking computer called The Window. At its heart is a 6502 with sophisticated sound and graphic chips. First reports suggested maximum K would be 64, but Francis felt this situation might change. "I think we're looking at a choice of two models, 64K or 128K, the latter being, obviously, slightly more expensive to hire."

I suggested that the technical comparison might be with a Commodore 64. "Well, I think it's a little more than that. If it has to be compared with an existing machine, I'd opt for an Apple IIe."

In any event, comparisons are going to be misleading because of the speed with which the system can be loaded. "64K is only going to take a couple of seconds. It'll be better than almost any disc drive. This means that extremely elaborate games can be devised with terrific graphics — adventures, for example, where the next section is loaded once you've reached a certain point."

Superficially, one problem with renting the computer would seem to be the incredible rate of technical obsolesence in the computer industry — how impressive will The Window's specifications look in two or more years time?

"There are basically two answers to that. Firstly, we already have in mind various enhancements that we could make to the existing machines. Secondly, if The Window starts to get too far behind, we could consider replacing it."

The name of the game though, is software. "Really, software is the be all and end all of our service — it's being proved more and more that it's the quality of the software that really matters."

Smith's, inconjunction with associates in America and Canada, have licensing arrangements with most of the major software houses in America. They have even been to Europe. "There will be some very unusual education programs from France for example."

As yet, no British software houses have been signed. "We haven't got around to Britain yet, but obviously there are a number of companies we have in mind — it might prove to be a good way for software houses in this country to test out the market for their games worldwide."

Initially, Francis sees the market for the network being people who are wary of risking much money on buying something



they may not need. "In particular, I see us selling the system to people who think they might be interested in the market but aren't sure — we can give them the chance to experiment without risking too much money."

Francis sees it as important that the network has a wide range. "We're after the whole family. Subscribers will be receiving a monthly magazine letting them know what's going to become available with tips on the games and other features."

In fact, the title The Games Network may prove to be somewhat misleading. Games currently account for only a quarter of the scheduled time.

"We envisage a large number of both educational and tutorial programs being available, not just for children at school but to learn a foreign language, craft or skill."

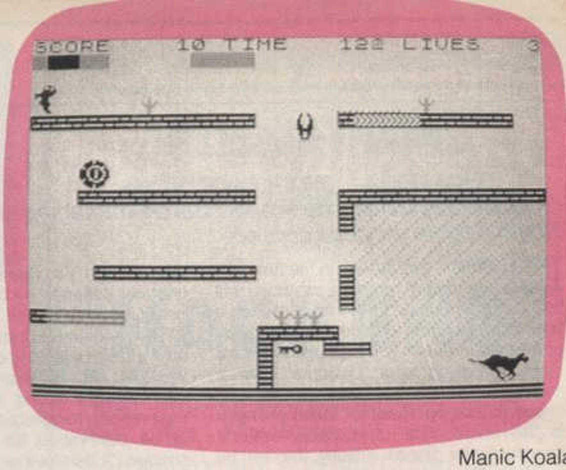
The big unanswered question is, of course, how much the system is going to cost. Previous reports had suggested a figure of about £10 per month, including the machine and unlimited downloading of software. "I think pricing is still a little uncertain. In some ways it's fairest from every point of view to simply get people to pay for whatever they download, with some programs being more expensive than others. The big problem with that is the extra cost of accounting for it all."

Whatever is finally decided, it looks like the system will be relatively cheap and for games addicts it will solve one massive problem — most games have a life of not more than two months; as the game is mastered, so enthusiasm wanes and the program is not loaded any more.

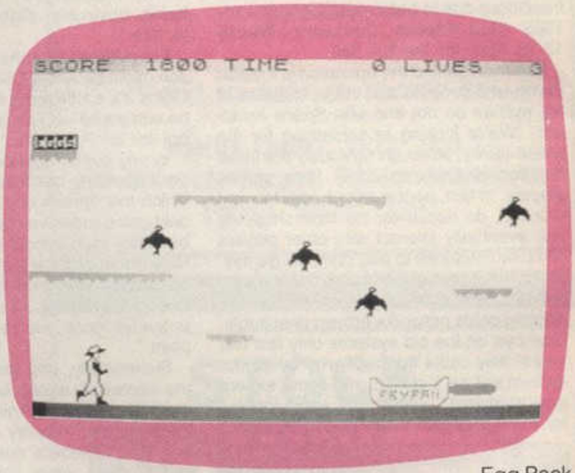
The analogy, if you like, is with renting videos of films — many people hire videos of films they would not otherwise see, because they are cheap and available.

If the faith evidenced by the amount of money W H Smith is putting into the operation is justified, the repercussions on the industry could be enormous. To what extent will people still want to actually buy games?

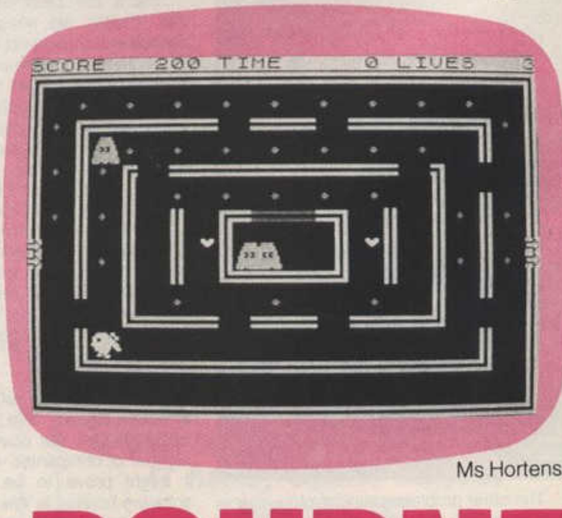
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All versions of "The Hobbit" are identical with regard to the adventure program. Due to memory limitations, BBC cassette version does not include graphics.

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POP4/4

Problems from space

Barbara Conway *risks life and limb in a selection of BBC games*

There comes a time in all our lives when we have to face up to the truth, however harsh it may appear. For me that moment came only a few weeks ago, and it was a bitter pill to swallow. After all, when you're 350 or so miles up in space at the controls of one of the most awesome technological advances yet, it's pretty tough to come to terms with the fact that, as a space pilot, you are a one-woman demolition squad. Honestly, if they had the likes of me up there on the space shuttle they'd probably end up having to cope with some really daft disasters. Like losing two multi-million pound satellites, for example.

It isn't for want of trying, either. Of the group of games I was trying out this time for the BBC, three of them were pointing out towards space and two involved the flight skills I yearned to acquire. Thus, after being accustomed to read reviews of such software by the usual venturers who are both competent and happy to boldly go into the vastness above, you now have the opportunity of learning from the experiences of a klutz with two left hands and a trail of mega-expensive wreckage in her wake.

To start, however, on a note rather less damaging to my ego, I was able to put up a considerably better showing with the latest offering in the adventure game line by the fiends at Level 9 Computing who have specialised in sagas designed to overheat the brain such as *Snowball (PCW* 15 Feb). The new adventure is *Lords of Time* and it does nothing to detract from Level 9's reputation as a provider of weeks of brainwork per game. Games from this source rarely cheat, so you can be sure that, if you can figure it out, there is a way out of every situation.

Nobody could accuse Sue Gazzard, who designed this saga (a sequel to which is already well advanced) of making life easy for the adventurer. From a sitting start, reasonably enough at your own micro, the story takes the adventurer through nine increasingly bizarre worlds, in most of which even the wary and experienced traveller will probably get killed at least once. The journey quickly becomes an obsession, even when you are in the "real world". It was when poring through a grimly serious financial report in my office, for example, that the solution to the sabre-toothed tiger problem suddenly struck me (making a pleasant change since the tiger itself had struck me, with fatal effect, several times during the previous evening's adventuring).

The zones must be taken in the proper order since that is the only way to collect the wherewithal to solve the problems, and the accompanying booklet provides some useful, if well-wrapped up, clues. Don't be fooled by the fact that the first zone seems extremely tame, this is the lull before eight storms. Animals tend to behave a little unusually (I still can't believe the way I got the fur coat in the Ice Age) but at least the various species have conventional tastes. There is an optimum 1,000 points to be gained in the quest to collect nine treasures and defeat the evil timelords, with progress marked in 25-point steps. Scenarios range from a Viking longship to the Milky Way, ending up with paradise. Treasures should be deposited in the clock (if you can't work out how to get into and out of the clock, you won't survive long anyway) and the sands of time are running out.



At the time of writing I still haven't finished my quest, although I have worked my way through most of the zones and sampled the others. The variety of problems, including several monsters, is extraordinary and requires the adventurer to draw on skills ranging from that of the agent provocateur (if faced with two menaces see if you can get them to fight each other) through animal dentistry, electronic expertise and some good old-fashioned magic. *"Lords"* also encourages some of the finer feelings. Generosity, such as helping to clothe the needy, can bring its own reward.

This adventure is full of surprises, including meeting one adversary more familiar to *Dr Who* addicts, which seems only fair since you are dealing with timelords. Make sure that you remember the key poem given in the documentation, don't let the timelords see you and resist impulses to be gratuitously nasty (if you throw that rotten apple you'll regret it) and this should keep any adventure addict satisfied.



On to the rather more familiar world of Mr Micro's *Humphrey*, a close relation of sundry small beings on various micros who have to negotiate piles of cubes without falling foul of deadly obstacles, in this case bombs. *Humphrey* can be guided by either joystick or keyboard through different screens each with increasing danger factors, and you can select the start screen. There are nine different arenas for *Humphrey* to bounce around on, changing the colour of each block as he lands on it, ranging from a straightforward pyramid at the start to more convoluted arrangements. At first the bombs just thud downwards haphazardly, but as you progress they get sneakier, bouncing up on *Humphrey* when you are not looking. Each screen is completed when *Humphrey* has visited each block.

The program has clear aracade-style colour graphics and plenty of ear-splitting sound effects. *Humphrey* has three lives per game and getting him round all the

cubes becomes an increasingly frantic operation. Not exactly a sparkling new idea, but more absorbing than many others.

Missile Control, from Gemini, is even harder on the eardrums and gives a dazzling screen display as you attempt to clear the skies of enemy bombs with your own three missile bases. The instructions



are contained in the first part of the program and, even after reading them carefully, the first try at the real thing left me with a score of exactly nil. I think it was at this stage of the review procedure that I started to realise that maybe dealing with problems from space was not my forte.

Pulling myself together, however, I improved my total to nearly 5,000 as jets and more obscure enemy craft whined overhead and the screen filled with the wake of thwarted bombs. After each wave the screen works out a bonus for you (it becomes increasingly hard to get) and from the sixth wave the bombs start to think for themselves. I wasn't much good at this game, but I enjoyed trying and the graphics are rewarding even when, once again, this incompetent missile controller had lost all her bases and left earth to the mercy of the alien (I think they were alien) nasties.

It was with mixed feelings that, after failing to distinguish myself with the Gemini package, that I loaded Compusoft's *Space Mission Simulator* into my machine. My misgivings were justified, but this is in no way a reflection on a program which, for one of the cheapest prices going, gives an enjoyable three-part game.

All instructions are on screen, with virtually no packaging given to the cassette itself. Task one is to get to your spacecraft and this proved to be so simple that even I managed it. This space mission is carried out by keyboard, with no joystick option and the pilot zips across the screen simply by alternate pressing of the "N" and "M" keys.

Stage two gives a screen representaion of the spacecraft dashbord. You have, in appropriate sequence, to arm the lasers, refuel, switch on the engines, disengage the brakes etc, all via the appropriate keys so it helps if you have noted them on the crib sheet. When all is successfully accomplished, you have lift-off.

The scene now changes to a "penetrator"-type scenario where you see the ship in what seems to me, as an admitted non-expert in space warfare, a launching route which guarantees that fighters scrambling to get into space and engage invaders will suffer maximum time-consuming difficulty. I crashed my ship several times negotiating the launch tunnel before managing to emerge into open space and I haven't managed to nobble the invading craft yet.

At the end of each session you are given a score out of 500, together with a comment on your performance. The top score I received was 166 and the usual comment was "Disgraceful". But, even through my chagrin, I have to admit that for the money this offers better-than-average value.

Under the circumstances, I think it was very brave of me to attempt Microdeal's *Space Shuttle,* a program which has already received plaudits for its original implementation on the Dragon. "So you think you can control the most complex piece of flying machinery?" asks the blurb on the program package. Well I didn't, so the outcome is not really that much of a disappointment to me. On the other hand, the program itself is no kind of disappointment at all, quite the contrary.

While waiting for the program to load I read the daunting but invaluable 14-page documentation accompanying it. Like *Space Mission Simulator* this is a multi-part affair, but there any similarity stops dead. Every stage of *Space Shuttle* is a major challenge and if it turns out that real prospective shuttle pilots are given this as an aptitude test I wouldn't be at all surprised.

As the program starts you are obviously at the control panel of the shuttle with a distinctly mountainous view through the window above the panel. This is launch stage and, while even the likes of me should be able to achieve lift-off, there are some crucial manoeuvres which must be achieved (via joystick or keyboard control) to get the shuttle into the proper orbit. As you lift off the mountain view descends and you must keep a keen eye on the control-board gauges and the "plotboard" which shows your course. The shuttle's boosters are pre-set to shut off at orbit velocity and by that time you should be in the box shown on the board.

That is the way you are supposed to reach the "park" stage. If you foul up the launch navigation then you get to parking position by default. You are free to guess how I got there. Parking is a very intricate affair requiring a mixture of keyboard and joystick input and fast reactions. The view from the window is of the satellite and you have to get it virtually into the centre of the window to complete the manoeuvre. After that comes the "arm" stage which, unlike most games, does not imply that you are about to zap the satellite. In fact, you are there to secure it and bring it back for repairs so you must use a robot arm to lock into the satellite and bring it into your shuttle bay. You can see the movement of the arm and the opening and closing of the bay doors as (maybe) you bring the satellite in within the 100-second time limit.

Then comes re-entry into Earth's atmosphere, no engines this time, you're gliding, followed by the landing stage. This is a lot richer than launch and the odds on splattering your craft across the desert are pretty good. *Space Shuttle* has clear black and white graphics, realistic accompanying sound and a dangerously addictive quality overall. This is a real test of skill and at the end points are awarded out of a total 600. If you think I'm telling how much I got, think again. Dammit, I have my pride.

Supplier	Program	Cost
Level 9 Computing 229 Hughenden Road High Wycombe Bucks HP13 5PG	*Lords of Time*	£9.90
Mr. Micro PO Box 24 Swinton Manchester M27 3AI	*Humphrey*	£6.90
Gemini 18A Littleham Road Exmouth Devon	*Missile Control*	£9.95
Compusoft 32 Watchyard Lane Formby Liverpool L37 3JU	*Space Mission Simulator*	£4.99
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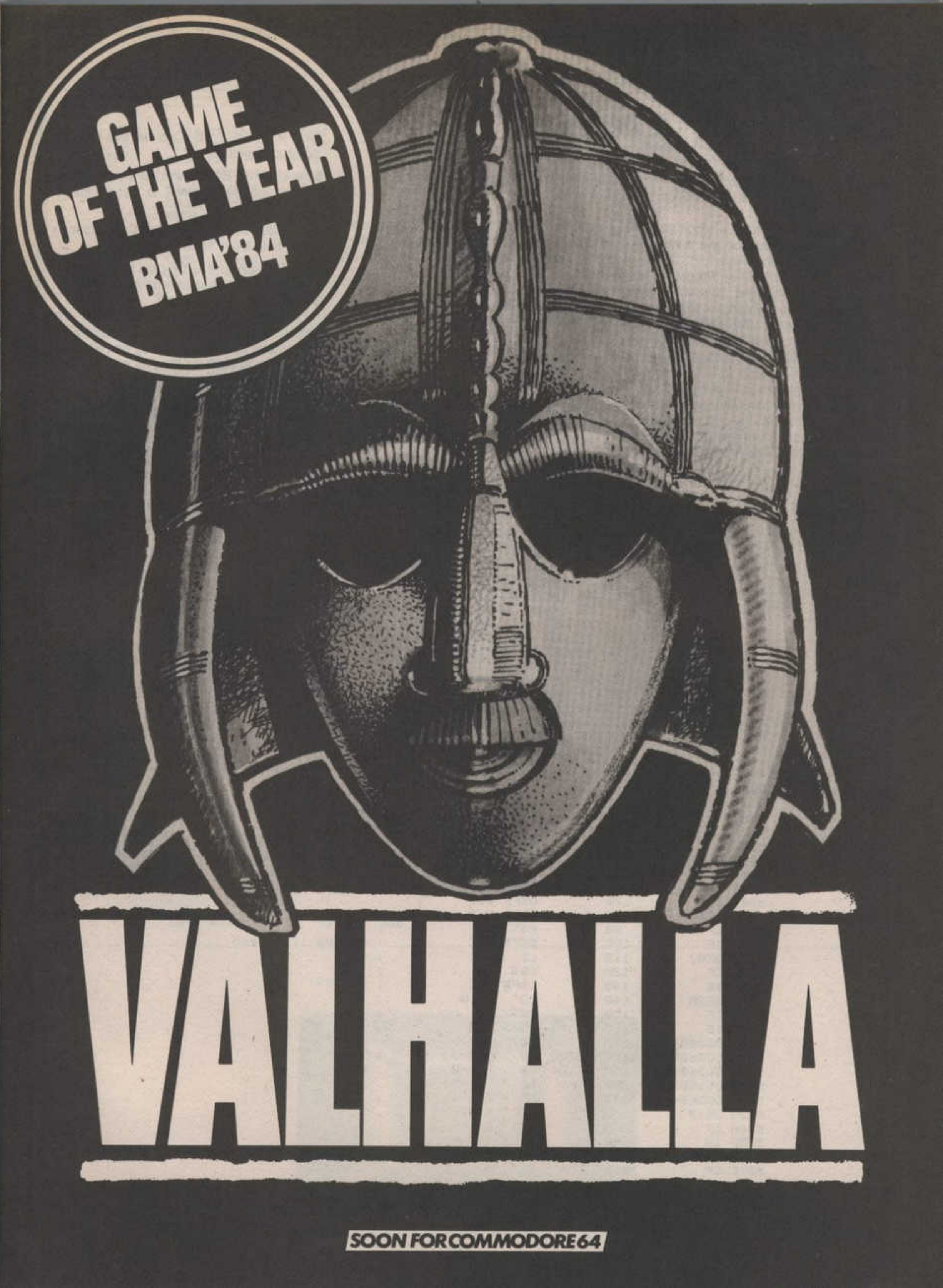
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Dumping ground

***Alan Turnbull** demonstrates how to get a machine code screen dump on the Seikosha GP-250X printer*

This article introduces a machine code routine to be used on the Sinclair ZX Spectrum with ZX Interface 1, RS 232 lead and Seikosha GP-250X Programmable Graphic Printer attached. This will produce a hard copy of the high-resolution screen.

Figure 1 shows a simple Basic program which will do the job, but this is horrendously slow. The equivalent routine translated into Z80 machine code is a big improvement and is shown in Figure 2.

The machine code routine uses the hook codes available in the ZX Interface 1 system to send bytes of data directly across the RS 232 link. The instructions

```
RST 8
DEFB #1E
```

send the byte held in the accumulator to the RS 232 device and so to use the routine, only the following Basic commands are neccessary:

```
FORMAT "b"; 2400
RANDOMIZE USR 23296
```

Several 16K ROM calls are made and they are as follows:

Line 380: CALL #22CE evaluates the POINT function with the x co-ordinate in the C register and the y co-ordinate in the B register and places the result on the calculator stack.

Line 400: CALL #2D28 places the contents of the accumulator on the calculator stack.

Line 410: RST 40 invokes the floating point calculator.

Line 420: DEFB 4 causes the top two items on the calculator stack to be multiplied together.

Line 430: DEFB 56 causes the floating point calculator to stop operating.

Line 440: CALL #2DD5 gets the last value on the calculator stack and compresses it into the accumulator.

The routine was assembled on the excellent and professional Z80 GENS3M Assembler by Hisoft and may be relocated anywhere in Ram as long as one remembers to alter the variable pointer in line 40.

Figure 3 shows an example output generated by the routine which takes only a few minutes to produce unlike its Basic equivalent.

I hope readers will find the routine useful and perhaps adapt it for other models of printers.

Figure 1

```
  5 FORMAT "b";2400
 10 OPEN #3;"b"
 20 LPRINT CHR$ 27;"L";CHR$ 2;CHR$ 10;
 30 FOR y=175 TO 7 STEP -8
 40 FOR x=0 TO 255
 50 LPRINT CHR$ 27;"G";CHR$ 0;CHR$ 1;
 60 LET p=1: LET b=0: LET l=0
 70 LET b=b+p*POINT (x,y-l)
 80 LET p=p*2: LET l=l+1
 90 IF p<=128 THEN  GO TO 70
100 LPRINT CHR$ b;
110 NEXT x
120 LPRINT CHR$ 10
130 NEXT y
140 LPRINT CHR$ 27;"L";CHR$ 3;
150 CLOSE #3
```

Figure 2

```
Pass 1 errors: 00

                  10 * Seikosha GP-250X Hi-res screen copy for ZX Spectrum
                  20 * (c) Copyright 1984 Alan Turnbull
5B00              30         ORG  23296       ; in printer buffer
5B00 DD21905B     40         LD   IX,VARS     ; point to variables
5B04 3E1B         50         LD   A,27        ;
5B06 CF           60         RST  8           ;
5B07 1E           70         DEFB #1E         ;
5B08 3E4C         80         LD   A,"L"       ;
5B0A CF           90         RST  8           ;
5B0B 1E          100         DEFB #1E         ; set up line feed
5B0C 3E02        110         LD   A,2         ;
5B0E CF          120         RST  8           ;
5B0F 1E          130         DEFB #1E         ;
5B10 3E0A        140         LD   A,10        ;
5B12 CF          150         RST  8           ;
5B13 1E          160         DEFB #1E         ;
5B14 DD3601AF    170         LD   (IX+1),175  ; y:=175
5B18 DD360000    180 NEXTY   LD   (IX+0),0    ; x:=0
5B1C DD360201    190 NEXTX   LD   (IX+2),1    ; p:=1
5B20 DD360300    200         LD   (IX+3),0    ; b:=0
5B24 DD360400    210         LD   (IX+4),0    ; l:=0
5B28 3E1B        220         LD   A,27        ;
5B2A CF          230         RST  8           ;
5B2B 1E          240         DEFB #1E         ;
5B2C 3E47        250         LD   A,"G"       ;
5B2E CF          260         RST  8           ;
5B2F 1E          270         DEFB #1E         ;
5B30 3E00        280         LD   A,0         ;
5B32 CF          290         RST  8           ; set up graphic mode
```

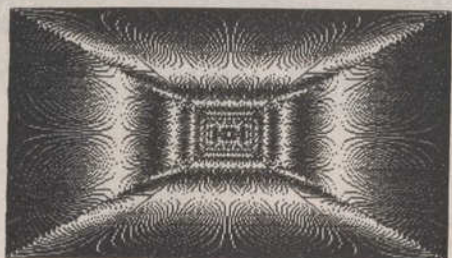
```
5B33 1E          300          DEFB #1E        ;
5B34 3E01        310          LD   A,1        ;
5B36 CF          320          RST  8          ;
5B37 1E          330          DEFB #1E        ;
5B38 DD7E01      340 L70      LD   A,(IX+1)   ;
5B3B DD9604      350          SUB  (IX+4)     ;
5B3E 47          360          LD   B,A        ;
5B3F DD4E00      370          LD   C,(IX+0)   ; co-ords x,y-l
5B42 CDCE22      380          CALL #22CE      ; result of POINT(x,y-l) on stack
5B45 DD7E02      390          LD   A,(IX+2)   ;
5B48 CD282D      400          CALL #2D28      ; put p on stack
5B4B EF          410          RST  40         ;
5B4C 04          420          DEFB 4          ;
5B4D 38          430          DEFB 56         ; p*POINT(x,y-l) on stack
5B4E CDD52D      440          CALL #2DD5      ; collect result
5B51 DD8603      450          ADD  A,(IX+3)   ; b+p*POINT(x,y-l)
5B54 DD7703      460          LD   (IX+3),A   ; b:=b+p*POINT(x,y-l)
5B57 DDCB0226    470          SLA  (IX+2)     ; p:=p*2
5B5B DD3404      480          INC  (IX+4)     ; l:=l+1
5B5E DD7E02      490          LD   A,(IX+2)   ;
5B61 FE00        500          CP   0          ;
5B63 20D3        510          JR   NZ,L70     ; IF p<=128 THEN GOTO 70
5B65 DD7E03      520          LD   A,(IX+3)   ;
5B68 CF          530          RST  8          ;
5B69 1E          540          DEFB #1E        ; send CHR$ b
5B6A DD3400      550          INC  (IX+0)     ;
5B6D 20AD        560          JR   NZ,NEXTX   ; NEXT x
5B6F 3E0A        570          LD   A,10       ;
5B71 CF          580          RST  8          ;
5B72 1E          590          DEFB #1E        ; send CHR$ 10;CHR$ 13
5B73 3E0D        600          LD   A,13       ;
5B75 CF          610          RST  8          ;
5B76 1E          620          DEFB #1E        ;
5B77 DD7E01      630          LD   A,(IX+1)   ;
5B7A D608        640          SUB  8          ;
5B7C DD7701      650          LD   (IX+1),A   ;
5B7F FEFF        660          CP   255        ;
5B81 2095        670          JR   NZ,NEXTY   ; NEXT y
5B83 3E1B        680          LD   A,27       ;
5B85 CF          690          RST  8          ;
5B86 1E          700          DEFB #1E        ;
5B87 3E4C        710          LD   A,"L"      ;
5B89 CF          720          RST  8          ; set up normal line feed
5B8A 1E          730          DEFB #1E        ;
5B8B /3E03       740          LD   A,3        ;
5B8D CF          750          RST  8          ;
5B8E 1E          760          DEFB #1E        ;
5B8F C9          770          RET
                 780 VARS

Pass 2 errors: 00

L70      5B38     NEXTX   5B1C
NEXTY    5B18     VARS    5B90

Table used:     58  from    360
```

Figure 3.



Conditional responses

***Jason Orbaum and Geoffrey Campbell,** in the fourth part of their series on 6809 assembly language programming, look at the condition code register and branch instructions*

So far we have published the assembler versions of Listings one and two.

A lot of you probably saw the command *BNE Loop* and wondered what it did. By a process of elimination, and with a certain amount of common sense, it could have been worked out that this command was replacing the Basic *Goto* that makes the program loop.

This mnemonic does, in fact, stand for Branch if Not Equal. This construction will be dealt with in more detail later, but for now, an explanation of the relative addressing mode.

Up to now, all addresses have been numbers between 0 and 65535, representing an address in memory. In relative addressing, however, the address is given as a number corresponding to the offset from the address at which the instruction currently being executed is stored. This mode is used exclusively for the branch instructions.

On the diagram of the processor in Part 2 of this series there is a section labelled CC Register. This is the Condition Code Register. It is set or reset depending on the value of a byte being computed or transferred and it can be tested and acted upon, for instance by the branch instructions.

The Condition Code Register is set out so:

E F H I N Z V C

where

E, F, and I are used in conjunction with interrupts, and are of no use at the moment;

H is used for Binary Coded Decimal arithmetic, and cannot be tested directly;

N is the negative flag, and is set when the result of a calculation is less than zero;

Z is the zero flag, and is set when the result of a calculation is zero, ie, the two numbers under consideration are equal;

V is the overflow flag, and is set when the result of an eight-bit addition is greater than 255;

And C is the carry flag, and acts as a ninth bit for some arithmetic operations.

Of these, only the last four are of any real use with the branch instructions, which are:

BCC = Branch on Carry Clear	(C=0)
BCS = Branch on Carry Set	(C=1)
BEQ = Branch on Equal To Zero	(Z=1)
BNE = Branch on Not Equal To Zero	(Z=0)
BMI = Branch on Minus	(N=1)
BPL = Branch on Plus	(N=0)
BVC = Branch on Overflow Clear	(V=0)
BVS = Branch on Overflow Set	(V=1)

The other branch instructions test for different combinations of CC Bits. These are:

BGE = Branch on Greater Than or Equal To
BGT = Branch on Greater Than
BLE = Branch on Less Than or Equal to
BLT = Branch on Less Than

This list may look daunting, but it is actually very easy to get used to the branch instructions. One way to use them is for comparing numbers. If there is a number in the A register, then to test it to see if it is less than 10, we could use

```
SUBA #10
BLT BACK
```

where BACK is the location to jump to, say a loop of some kind. Unfortunately, this destroys the value in A, so it will have to be stored before testing, and reloaded afterwards, thereby using a memory location as store, and requiring two more machine instructions — hardly ideal code! There is, however, an instruction that does the whole lot in one go. This is the *CMP* (or Compare) instruction.

The test routine now becomes:

```
CMPA #10
BLT BACK
```

It doesn't look any shorter, does it? But it would be in a program, since it cuts out two machine instructions.

There are two more branch instructions: *BRA* and *BSR*.

First, let's look at *BRA*. This is used in the same way as the others, but it is slightly different in that it is not conditional — the initials stand for Branch Always, and it does just that.

The *BSR* instruction stands for Branch to Subroutine, and is not conditional. When it is executed, the address of the next instruction is pushed on to the stack, and execution transferred to the subroutine. When an *RTS* (Return from Subroutine) command is found, the address that was pushed on to the stack before going to the subroutine is pulled from the stack, and execution continues from this point. It should be noted, therefore, that the stack should be left in the same condition just before an *RTS* as it was just before the corresponding *BSR*, unless the return address is to be purposely changed, in which case execution continues from this new address.

The branch instructions only occupy two bytes, in the program, and this means that the address offset can only be between −128 and 127. There is, therefore, another set of instructions called the long branches. The mnemonics are as for normal branches, but preceded by an L. For example, *BRA* becomes *LBRA*. This can now access an offset between −32768 and 32767.

There are another two instructions to modify the order in which a program executes: *JMP* and *JSR*. Both of these use either extended, direct, or indexed addressing. *JMP* jumps to the specified address, whereas *JSR* jumps to a subroutine at the specified address. They are to be avoided if at all possible, so that the code is position independent; that is, it can be stored at any position in memory. ⟳



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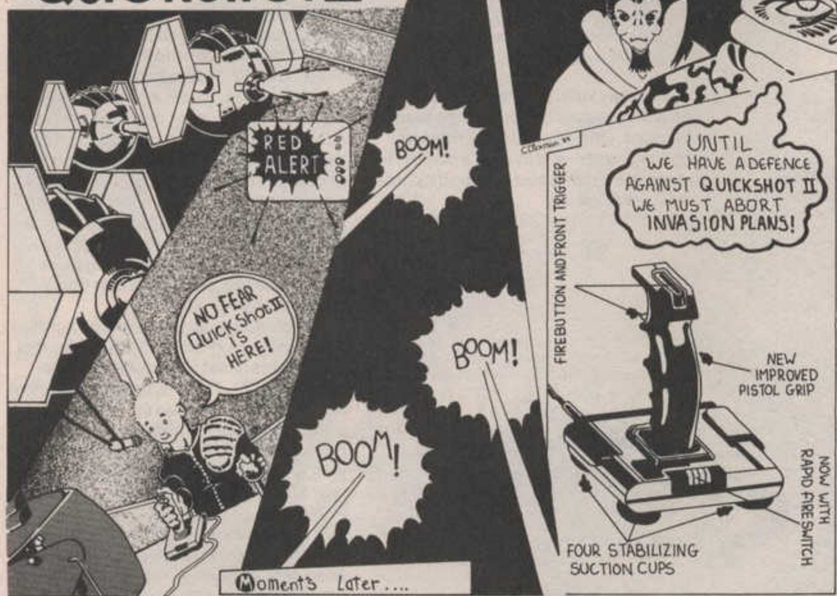
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A character count

***Mark Lawrence** develops a 64 character width word processor for the Spectrum*

This program uses 64print in a word processor allowing text to be entered on a 64 x 24 format. The program offers the following facilities, all accessed by pressing the cap shift key along with the appropriate key:

Capshift + 0 Delete.
„ + 1 Clear memory.
„ + 2 Capital lock.
„ + 3 Move back one page.
„ + 4 Move forward one page.
„ + 5 Move cursor left.
„ + 6 Move cursor down.
„ + 7 Move cursor up.
„ + 8 Move cursor right.

Pressing both shift keys causes the cursor to disappear which indicates extended mode. Extended mode has the following facilities:

Pressing S allows text to be saved to tape. The program will ask for the start page. Enter a letter between A and Y,A being the first page and Y the 25th. You will now be asked for the last page, again enter a letter between A and Y, but first start the tape.

Pressing L allows text to be loaded from tape.

Pressing Z allows you to copy the currently displayed screen to the ZX printer.

In addition pressing space will return you to Basic. Enter *Goto* 30 to return. On a 48k Spectrum you can store 25 pages of text, which amounts to 38400 characters or about 9600 words.

Before typing in the machine code, enter the short basic program and *Save* "word" *Line 1*. Having verified this, type in the hex loader and enter the machine code to address 30000, then *Save* "word code" *Code* 30000, 1700. Verify this, then clear the machine and rewind the tape. Type *Load*"" and start the tape. If all is well the program should load and run, then after a short delay a solid cursor should appear in the top left corner of the screen.

If this does not occur, type in the check program, load the code into address 30000 and check it against the listing, poking any incorrect entries.

```
Word Processor Basic
>LIST
  10 CLEAR 23999:LOAD ""CODE 24000
  20 BORDER 6:POKE 23693,40
  30 RANDOMIZE USR 24000
```

```
WORD PROCESSOR CODE
5DC0  21 00 40 22 5F 61 AF 21
5DC8  55 61 77 23 77 21 08 5C
5DD0  77 CD 9E 60 CD 53 5E CD
5DD8  80 5E CD 63 5E 21 08 5C
5DE0  7E FE 0E 28 36 D6 20 DA
5DE8  9B 5E FE 60 30 EC 36 00
5DF0  CD BE 5F CD 03 61 CD 92
5DF8  60 2A 5F 61 CD E3 60 1E
5E00  01 CD E5 5F 3A 55 61 B5
5E08  FE 00 20 04 7C C6 07 67
5E10  22 5F 61 CD 63 5E CD 80
5E18  5E 18 BF E5 CD 92 60 E1
5E20  CD 80 5E AF 77 7E FE 00
5E28  28 FB CD 92 60 CB AF FE
5E30  00 28 1F FE 53 CC 1B 60
5E38  FE 4C CA FC 5F FE 5A 20
5E40  06 F3 06 C0 CD AF 0E CD
5E48  80 5E AF 21 08 5C 77 C3
5E50  DA 5D C9 21 00 58 11 01
5E58  58 01 00 03 3A 8D 5C 77
5E60  ED B0 C9 3A 60 61 FE 58
5E68  38 07 21 FF 50 3E 01 18
5E70  08 FE 40 30 0A 21 00 40
5E78  AF 22 5F 61 32 55 61 C9
5E80  F5 E5 0E F0 3A 55 61 FE
5E88  00 28 02 0E 0F 06 08 2A
5E90  5F 61 7E A9 77 24 10 FA
5E98  E1 F1 C9 7E FE 0C 20 27
5EA0  CD 80 5E 2A 5F 61 1E FF
5EA8  CD E5 5F 3A 55 61 FE 01
5EB0  20 09 7D FE FF 20 04 7C
5EB8  D6 07 67 22 5F 61 AF CD
5EC0  03 61 CD E3 60 18 23 FE
5EC8  0D 20 21 CD 80 5E 2A 5F
5ED0  61 7D E6 E0 6F 01 20 00
5ED8  FE E0 20 03 01 20 07 09
5EE0  22 5F 61 CD 63 5E AF 32
5EE8  55 61 18 1D FE 08 20 1B
5EF0  2A 5F 61 7D E6 1F FE 00
5EF8  20 07 3A 55 61 FE 00 28
5F00  1D CD 80 5E 1E FF CD E5
5F08  5F 18 38 FE 09 20 1B 2A
5F10  5F 61 7D E6 1F FE 1F 20
5F18  07 3A 55 61 FE 01 28 53
5F20  CD 80 5E 1E 01 CD E5 5F
5F28  18 1C FE 0A 20 1A CD 80
5F30  5E 2A 5F 61 01 20 00 7D
5F38  D6 E0 38 03 01 20 07 09
5F40  22 5F 61 CD 63 5E 18 69
5F48  FE 0B 20 1C CD 80 5E 2A
5F50  5F 61 01 20 00 7D D6 20
5F58  30 03 01 20 07 A7 ED 42
5F60  22 5F 61 CD 63 5E 18 49
5F68  FE 06 20 09 01 6A 5C 0A
5F70  EE 08 02 18 3F FE 04 20
5F78  16 3A 56 61 FE 00 28 34
5F80  3D 32 56 61 CD 9E 60 21
5F88  00 40 22 5F 61 18 22 FE
5F90  05 20 0A 3A 56 61 FE 18
5F98  28 1A 3C 18 E4 FE 07 20
5FA0  1A 21 61 64 11 62 64 01
5FA8  00 96 36 00 ED B0 C3 C0
5FB0  5D CD 80 5E CD 92 60 AF
5FB8  32 08 5C C3 DA 5D F5 2A
5FC0  5F 61 7C D6 40 CB 3F CB
5FC8  3F CB 3F 67 29 ED 5B 55
5FD0  61 7A 16 00 19 EB 87 67
5FD8  87 84 67 2E 00 19 11 61
5FE0  64 19 F1 77 C9 01 55 61
5FE8  0A 83 E6 01 02 83 FE 00
5FF0  20 01 2B FE 01 20 01 23
5FF8  22 5F 61 C9 F5 DD 21 B0
6000  5C 11 02 00 AF 37 CD 56
6008  05 DD 21 61 64 ED 5B B0
6010  5C 3E FF 37 CD 56 05 F1
6018  C3 C0 5D F5 06 02 21 2B
6020  61 C5 06 15 7E D7 23 10
6028  FB CD 7B 60 C1 78 FE 02
6030  20 04 7B 32 57 61 10 E9
```

```
6038 3A 57 61 4F 7B 91 3C 87
6040 67 87 84 67 2E 00 22 B0
6048 5C 11 02 00 DD 21 B0 5C
6050 AF 37 CD C2 04 3A 57 61
6058 87 67 87 84 67 2E 00 01
6060 61 64 09 E5 DD E1 ED 5B
6068 B0 5C 3E FF 37 CD C2 04
6070 F1 3A 56 61 CD 9E 60 CD
6078 53 5E C9 E5 21 08 5C 36
6080 00 7E CB AF D6 41 38 F9
6088 FE 19 30 F5 CD 92 60 5F
6090 E1 C9 F5 21 64 00 11 03
6098 00 CD B5 03 F1 C9 87 67
60A0 87 84 67 2E 00 11 61 64
60A8 19 EB 21 00 40 AF 32 55
60B0 61 01 00 06 E5 D5 C5 EB
60B8 7E CD 03 61 C1 D1 E1 CD
60C0 E3 60 13 3A 55 61 FE 01
60C8 20 0A 23 7D FE 00 20 04
60D0 7C C6 07 67 3A 55 61 3C
60D8 E6 01 32 55 61 0B 78 B1
60E0 20 D2 C9 C5 D5 E5 11 57
60E8 61 3A 55 61 0E 0F FE 01
60F0 20 02 0E F0 06 08 EB 1A
60F8 A1 86 12 23 14 10 F8 ET
6100 D1 C1 C9 E5 11 57 61 6F
6108 26 00 29 29 29 01 61 61
6110 09 06 08 4E 3A 55 61 FE
6118 00 28 08 CB 39 CB 39 CB
6120 39 CB 39 79 12 23 13 10
6128 EA E1 C9 16 15 00 46 72
6130 6F 6D 20 77 68 69 63 68
6138 20 50 61 67 65 20 3F 20
6140 16 15 00 54 6F 20 77 68
6148 69 63 68 20 70 61 67 65
6150 20 3F 20 20 20 00 18 00
6158 00 00 00 00 00 00 00 00
6160 40 00 00 00 00 00 00 00
6168 00 00 40 40 40 40 00 40
6170 00 00 50 A0 00 00 00 00
6178 00 00 00 A0 E0 A0 E0 A0
6180 00 00 40 60 80 40 20 C0
6188 40 00 00 D0 E0 70 B0 00
6190 00 00 00 40 A0 40 A0 60
6198 00 00 20 40 00 00 00 00
61A0 00 00 40 80 80 80 80 40
61A8 00 00 40 20 20 20 20 40
61B0 00 00 00 A0 40 E0 40 A0
61B8 00 00 00 00 40 E0 40 00
61C0 00 00 00 00 00 40 40 80
61C8 00 00 00 00 00 E0 00 00
61D0 00 00 00 00 00 00 00 80
61D8 00 00 20 20 40 40 80 80
61E0 00 00 40 A0 A0 E0 A0 40
61E8 00 00 40 C0 40 40 40 E0
61F0 00 00 40 A0 20 40 80 E0
61F8 00 00 E0 20 40 20 A0 40
6200 00 00 20 60 A0 A0 F0 20
6208 00 00 E0 80 C0 20 A0 40
6210 00 00 60 80 C0 A0 A0 40
6218 00 00 E0 20 20 40 40 40
6220 00 00 40 A0 40 A0 A0 40
6228 00 00 60 A0 A0 60 20 20
6230 00 00 00 40 00 40 00 00
6238 00 00 00 40 00 40 40 80
6240 00 00 00 20 40 80 40 20
6248 00 00 00 00 E0 00 E0 00
```

```
6250 00 00 00 80 40 20 40 80
6258 00 00 E0 20 40 40 00 40
6260 00 00 00 40 E0 E0 80 60
6268 00 00 40 A0 A0 E0 A0 A0
6270 00 00 C0 A0 C0 A0 A0 C0
6278 00 00 40 A0 80 80 A0 40
6280 00 00 C0 A0 A0 A0 A0 C0
6288 00 00 E0 80 C0 80 80 E0
6290 00 00 E0 80 C0 80 80 80
6298 00 00 40 A0 80 E0 A0 60
62A0 00 00 A0 A0 A0 E0 A0 A0
62A8 00 00 E0 40 40 40 40 E0
62B0 00 00 E0 40 40 40 40 80
62B8 00 00 A0 A0 C0 C0 A0 A0
62C0 00 00 80 80 80 80 80 E0
62C8 00 00 A0 E0 A0 A0 A0 A0
62D0 00 00 A0 A0 E0 A0 A0 A0
62D8 00 00 40 A0 A0 A0 A0 40
62E0 00 00 C0 A0 A0 C0 80 80
62E8 00 00 40 A0 A0 A0 E0 60
62F0 00 00 C0 A0 A0 C0 A0 A0
62F8 00 00 60 80 40 20 20 C0
6300 00 00 E0 40 40 40 40 40
6308 00 00 A0 A0 A0 A0 A0 40
6310 00 00 A0 A0 A0 A0 40 40
6318 00 00 A0 A0 A0 A0 E0 A0
6320 00 00 A0 A0 40 40 A0 A0
6328 00 00 A0 A0 40 40 40 40
6330 00 00 E0 20 40 40 80 E0
6338 00 00 C0 80 80 80 80 C0
6340 00 00 80 80 40 40 20 20
6348 00 00 C0 40 40 40 40 C0
6350 00 00 40 E0 40 40 40 40
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6360 00 00 60 80 80 C0 80 E0
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6378 00 00 00 40 A0 80 A0 40
6380 00 00 00 20 20 60 A0 60
6388 00 00 00 40 A0 C0 80 60
6390 00 00 00 60 80 C0 80 80
6398 00 00 00 60 A0 60 20 C0
63A0 00 00 00 80 80 C0 A0 A0
63A8 00 00 00 40 00 40 40 40
63B0 00 00 00 20 20 20 A0 40
63B8 00 00 00 A0 A0 C0 A0 A0
63C0 00 00 00 80 80 80 80 60
63C8 00 00 00 A0 E0 A0 A0 A0
63D0 00 00 00 40 A0 A0 A0 A0
63D8 00 00 00 40 A0 A0 A0 40
63E0 00 00 00 C0 A0 C0 80 80
63E8 00 00 00 60 A0 60 20 30
63F0 20 00 00 60 80 80 80 80
63F8 00 00 00 60 80 40 20 C0
6400 00 00 00 80 C0 80 A0 40
6408 00 00 00 A0 A0 A0 A0 40
6410 00 00 00 A0 A0 A0 40 40
6418 00 00 00 A0 A0 A0 E0 A0
6420 00 00 00 A0 A0 40 A0 A0
6428 00 00 00 A0 A0 60 20 A0
6430 40 00 00 E0 20 40 80 E0
6438 00 00 20 40 80 40 40 20
6440 00 00 40 40 40 40 40 40
6448 00 00 80 40 20 40 40 80
6450 00 00 50 A0 00 00 00 00
6458 00 00 60 90 F0 D0 F0 60
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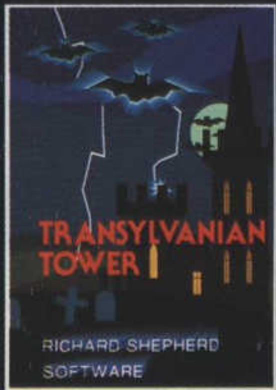
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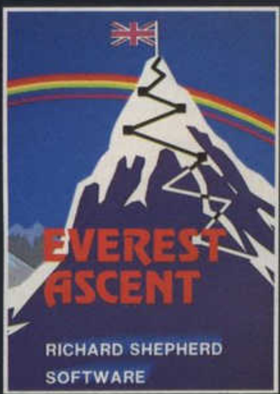
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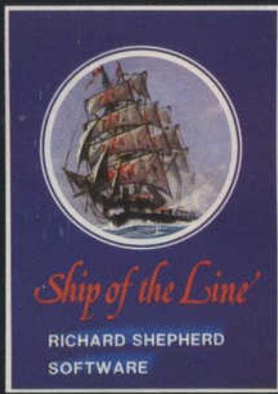
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***Mark Gornall** tries to escape The Vortex in a two-player battle of strategy, based on tv's* Adventure Game

This game will particularly appeal to any fan of the BBC2 tv series *Adventure Game*.

The Vortex is a strategic two-player game based on the last task that the tv adventurers have to complete.

One player (The Opponent) has to cross the playing grid to reach the exit, while the other (The Vortex) tries to prevent the Opponent's escape.

The Opponent cannot see where the Vortex is on the grid and if an accidental move is made into the Vortex the Opponent loses the game. The Vortex on the other hand can see the positions of both players but cannot move straight over the Opponent.. Instead, the Opponent must walk into the invisible trap and the Vortex must predict the Opponent's next move and position accordingly.

The Vortex and Opponent are controlled using the compass directions: E, W, NE, NW, SE, SW.

Program notes

2	Define variables
4	Clear sound chip
6–22	Introduction
24–36	Vortex move
38–52	Opponent move
54–64	Vortex illegal move
66–74	Vortex win
76–86	Opponent win
88–90	Lose sound
92–116	Draw grid
118–160	Check move

Variables

P1=Screen co-ordinate
C1=Colour co-ordinate
VX=Vortex's X co-ordinate
VY=Vortex's Y co-ordinate
X=Opponents X co-ordinate
Y=Opponents Y co-ordinate
S=Start of sound chip
V$=Name of vortex controller
N$=Name of opponent controller
G=Alternative for VX or X
H=Alternative for VY or Y

```
1 REM *** THE VORTEX - MARK G,1984 ***
2 POKE53280,0:POKE53281,0:P1=1024:C1=55296:VX=23:X=17:Y=3:VY=21:S=54272
4 FORI=STOS+24:POKEI,0:NEXT
6 PRINT"[CLR]":PRINTTAB(13)"[DOWN3][CTRL2]WELCOME TO ARG"
8 PRINT"[CBM7][DOWN2]NOW THAT YOU'VE PAID YOUR DROGNAS,"
10 PRINT"[DOWN1]WHAT IS THE NAME OF THE PLAYER WHO WILL"
12 INPUT"[DOWN1]PLAY ON BEHALF OF THE VORTEX";V$
14 INPUT"[DOWN1]AND YOUR OPPONENTS NAME IS";N$
16 PRINTTAB(7)"[DOWN2][CTRL2]GRONDA GRONDA ";V$;" AND ";N$:FORI=1TO4000:NEXT
18 PRINT"[CLR][CTRL6]OPPONENT:";N$;"=[CBM7][SFT@][CTRL6]
19 PRINT"VORTEX:";V$;"=[CTRL3][SFT@]"
20 GETA$:IFA$=""THEN20
22 GOTO46
24 GOSUB54:POKEP1+VX+40*VY,81:POKEC1+VX+40,2:POKEP1+X+40*Y,81
26 POKEC1+X+40*Y,14:INPUT"[CTRL6][HOME]WHAT IS THE VORTEX'S MOVE";M$
28 POKEC1+VX+40*VY,1:G=VX:H=VY:GOSUB80:VX=G:VY=H:GOSUB124
30 IFX=VXANDY=VYTHEN 128
32 POKEP1+VX+40*VY,81:POKEC1+VX+40*VY,2:PRINT"[HOME]PRESS A KEY BEFORE ";N$;
34 PRINT"[SPACE10]":PRINT"COMES BACK TO THE SCREEN."
36 GETA$:IFA$=""THEN36
38 GOSUB54:POKEP1+X+40*Y,81:POKEC1+X+40*Y,14:PRINT"[HOME][CTRL6]";N$;
40 INPUT",WHAT IS YOUR MOVE.";M$:POKEC1+X+40*Y,1:G=X:H=Y:GOSUB80:X=G:Y=H
42 GOSUB124:POKEP1+X+40*Y,81:POKEC1+X+40*Y,14:IFX=VXANDY=VYTHEN 136
44 FORI=1TO2000:NEXT:IFY=21THEN146
46 PRINT"[HOME]";N$;"[SPACE30]"
48 PRINT"SHOULD NOW BE AWAY FROM THE SCREEN."
50 GETA$:IFA$=""THEN50
52 GOTO24
54 POKES+5,38:POKES+6,95:POKES+24,15:POKES+1,34:POKES,75:POKES+4,33
56 FORI=1TO150:NEXTI:POKES+1,28:POKES,214:FORI=1TO200:NEXT:POKES+24,0:RETURN
58 GOSUB158:PRINT"[CLR][CTRL6]THAT WAS AN ILLEGAL MOVE,";V$
60 PRINT"[DOWN3]I'M SORRY TO SAY THAT YOU HAVE BEEN[DOWN3][CTRL2]"
61 PRINT"DISQUALIFIED !!!"
62 GETA$:IFA$=""THEN132
64 GOTO 146
66 GOSUB158:PRINT"[CLR][CTRL6]";N$;" HAS BEEN EVAPOURATED INTO SPACE.[DOWN2]"
68 PRINTV$;"[CBM6],YOUR SHUTTLE IS NOW LEAVING"
70 PRINT"[DOWN1]FOR EARTH,WELL DONE."
72 GETA$:IFA$=""THEN142
74 RUN
76 FORN=1TO4:POKES+24,15:POKES+1,137:POKES,43:POKES+4,33
78 FORI=0TO137:POKES+1,I:POKES+1,I+8:NEXTI:POKES+24,0:NEXTN
80 PRINT"[CLR][CBM6]WELL DONE ";N$:PRINT"YOU HAVE BEATEN THE VORTEX.[DOWN4]"
82 PRINT"[CTRL6]YOUR SHUTTLE LEAVES FOR EARTH IN 5 MINS."
84 GETA$:IFA$=""THEN154
86 RUN
88 FORI=1TO40:POKE53280,1:POKE53280,0:NEXTI:POKES+24,15:POKES+1,137:POKES,43
90 POKES+4,17:FORI=137TO0STEP-1:POKES+1,I:POKES+1,I+8:NEXTI:POKES+24,0:RETURN
92 PRINT"[CLR][CTRL2][DOWN2]":FORI=1TO4:PRINTTAB(17)"[SFT@][SFTC*5][SFT@]"
94 IF I<4THENPRINT"[DOWN4]":NEXTI
```

continued over the page ▶

```
96 PRINT"[HOME][DOWN3]":FORI=1TO3:PRINTTAB(16)"/ \   / \"
98 IFI<3THENPRINT"DOWN4]":NEXTI
100 PRINT"[HOME][DOWN4]":FORI=1TO3:PRINTTAB(15)"/   \ /   \"
102 IFI<3THENPRINT"[DOWN4]":NEXTI
104 PRINT"[HOME[DOWN5]":FORI=1TO3:PRINTTAB(14)"[SFTQ][SFTC*5][SFTQ][SFTC*5][SFTQ
]"
106 IFI<3THENPRINT"[DOWN4]":NEXTI
108 PRINT"[HOME][DOWN6]":FORI=1TO3:PRINTTAB(15)"\   / \   /"
110 IFI<3THENPRINT"[DOWN4]":NEXTI
112 PRINT"[HOME][DOWN7]":FORI=1TO3:PRINTTAB(16)"\ /   \ /"
114 IFI<3THENPRINT"[DOWN4]":NEXTI
116 PRINTTAB(19)"[DOWN2][RVS]EXIT[RVOFF]":RETURN
118 IFM$="E"THENG=G+6

120 IFM$="W"THENG=G-6
122 IFM$="NE"THENG=G+3:H=H-3
124 IFM$="NW"THENG=G-3:H=H-3
126 IFM$="SE"THENG=G+3:H=H+3
128 IFM$="SW"THENG=G-3:H=H+3
130 IFG<14THENG=14
132 IFG>26THENG=26
134 IFH>21THENH=21
136 IFH<3THENH=3
138 IFH=3ANDG<17THENG=17
140 IFH=3ANDG=20THENG=23
142 IFH=3ANDG>23THENG=23
144 IFH=9ANDG<17THENG=17
146 IFH=9ANDG>23THENG=23
148 IFH=15ANDG<17THENG=17
150 IFH=9ANDG>23THENG=23
152 IFH=15ANDG<17THENG=17
154 IFH=15ANDG>23THENG=23
156 IFH=21ANDG<17THENG=17
158 IFH=21ANDG>23THENG=23
160 RETURN
```

A balancing act

Robert Crook presents a program to balance chemistry equations

This program is written for the BBC Model A or B and occupies some 2K of memory. The program is relatively short and uses the Mode 7 text.

If you are familiar with the idea of chemistry equations, then you will also be used to the idea of balancing them. With short equations this is often very simple, but when balancing longer equations the process is often hard, time-consuming and monotonous. This program can solve any balancing problem, no matter how long the equation.

For those of you not familiar with the idea of balancing, here is a brief explanation: When two or more chemicals are mixed together or heated they often react to produce different chemicals. For example, when sulphur is burned in oxygen the resultant gas is sulphur dioxide. This reaction can be expressed in words, ie:

Sulphur+oxygen = sulphur dioxide

The same reaction can, however, be expressed more precisely in the form of an equation, ie:

$S + O_2 = SO_2$

If you examine this equation you will see that there equal amounts of each element on each side of the equation, eg, on the left hand side there is one sulphur atom and two oxygen atoms. On the right hand side there is also one sulphur atom and two oxygen atoms. Therefore, this equation is already balanced. The following is not balanced:

$C_4H_{10} + O_2 = CO_2 + H_2O$

If you examine only the oxygen atoms you will see that there are two on the left but three on the right. The equation cannot, therefore, be balanced already. It would take considerable time to work this out without the aid of this program. As it is, the balanced equation is:

$2\ C_4H_{10} + 13\ O_2 = 8\ CO_2 + H_2O$

Using the program to solve this, the inputs would have been the following:

Number of reactant chemicals (Those on LHS)	2
Number of product chemicals (Those on RHS)	2
Input the reactant chemicals	C4H10 (Press Return)
	O2 (Press Return)
Input the product chemicals	H2O "
	H2O "

You will now have to wait for the computer to display the balanced equations on the screen.

All the elements used so far have only one letter for their symbol and this must be a capital letter, eg, C,S,H, etc. A great deal of elements, however, have two letters for their symbol, eg, Na, Pb, Li, etc. When inputing these types of elements you must enter the first letter as a capital and the second as lower case.

Line Number	Comments
90-190	These lines present the balanced equation
200-300	The equation is entered here
310-980	This procedure works out the number of atoms on each side of the equation according to the various elements

It is difficult to explain exactly how the program works. The best way is to take an example and balance it as the computer would. Let the equation be:

$H_2S + SO_2 = H_2O$

This is the reaction of hydrogen sulphide with sulphur dioxide to produce sulphur and water.

Firstly, the computer determines the elements present and places their symbols in an array. In this case there are three elements H, O and S. The next step is to find out how many atoms of each element are on each side of the equation. This is best shown in table form.

You can see in 5) that the number of atoms of each element on each side of the equation is equal. The equation is now balanced:

$2\ H_2S + SO_2 = 3\ S + 2\ H_2O$

		LHS			RHS			
Elements present		H	S	O	H	S	O	
No of atoms	1)	2	2	2	2	1	1	Add up the numbers on the LHS=6 (2+2+2) Add up the numbers on the RHS=4 More atoms on LHS, therefore add to the RHS. LHS has more S and more O. Try to find a chemical on the RHS with both S and O in. There is not one, so choose one with just S or O in. H2O will do. Place a 2 in front of this and calculate the result.
	2)	2	2	2	4	1	2	H2S+SO2=S+2H2O
								Add up the numbers in 2) for the LHS=6 Add up numbers for the RHS=7. Therefore add to the LHS. RHS has more H. Try to find a chemical on the LHS with H in it. H2S will do. Put a 2 in front of this and get result.
	3)	4	3	2	4	1	2	2H2S+SO2=2H20
								Add up the numbers in 3) for the LHS=9 Add up numbers for the RHS=7. Add to the RHS. LHS has more S. Find chemical on the RHS with S. S will do. Place a 2 in front of this.
	4)	4	3	2	4	2	2	2HS+SO2=2S+"H2O
								Add up the numbers in 4) for the LHS=9 Add up the numbers for the RHS=8. Add to the RHS. LHS has more S. Find chemical on the RHS with S. The S will do. There is already a 2 in front so now we must place a 3 there.
	5)	4	3	2	4	3	2	2H2S+SO2=3S+2H2O

```
>L.
   10 REM***************************
   20 REM*  Equations Balancer     *
   30 REM*     Robert   Crook      *
   40 REM*      March   1984       *
   50 REM***************************
   60 MODE 7
   70 PROCInput
   80 PROCWorkout
   90 CLS:PRINT TAB(2,5)CHR$(131)"The Equation has been balanced."
  100 PRINT''
  110 FOR A%=1 TO V
  120   IF U(A%)<>1 THEN PRINT CHR$(133)STR$(U(A%));
  130   PRINT CHR$(131)A$(A%);
  140   IF A%<RC OR (A%>RC AND A%<V) THEN PRINT"+";
  150   IF A%=RC THEN PRINT CHR$(130)"J";
  160   NEXT
  170 PRINTTAB(8,15)CHR$(134)"Press any Key "
  180 S=GET:RUN
```

```
 190 END
 200 DEFPROCInput
 210 PRINT'':PRINTCHR$(145);CHR$(157);CHR$(131);CHR$(141)"      Equations Balanc
er ":PRINTCHR$(145);CHR$(157);CHR$(131);CHR$(141)"      Equations Balancer "
 220 PRINT''
 230 INPUT"  How many reactant chemicals "RC
 240 INPUT"  How many product chemicals  "PC
 250 V=RC+PC:DIM A$(V)
 260 PRINTCHR$(131)" Input the reactant chemicals "
 270 FOR A=1 TO RC:INPUT TAB(2);A$(A):A$(A)=A$(A)+" ":NEXT
 280 PRINTCHR$(131)" Input the product chemicals"
 290 FOR B=(1+RC) TO V:INPUT TAB(2);A$(B):A$(B)=A$(B)+" ":NEXT B
 300 ENDPROC
 310 DEFPROCWorkout
 320 DIM B$(20):H=1
 330 FOR C%=1 TO V
 340   FOR D%=1 TO LEN(A$(C%))
 350     E$=(MID$(A$(C%),D%,1)):E=VAL(E$)
 360     IF E<>0 OR E$=" " OR E$="0" THEN 430
 370     IF ASC(MID$(A$(C%),D%+1,1))>90 THEN E$=MID$(A$(C%),D%,2):D%=D%+1
 380     B$(H)=E$:G=0
 390     FOR F%=0 TO H-1
 400       IF B$(F%)=B$(H) THEN G=1
 410       NEXT
 420     IF G<>1 THEN H=H+1
 430     NEXT
 440   NEXT
 450 NE=H-1:DIM A(V*NE),T(NE*2),U(V)
 460 FOR A%=1 TO V:U(A%)=1:NEXT
 470 FOR A%=1 TO V*NE:A(A%)=0:NEXT
 480 FOR K%=1 TO NE
 490   FOR I%=1 TO V
 500     FOR J%=1 TO (LEN(A$(I%))-1)
 510       Y$="":E1=0
 520       E$=MID$(A$(I%),J%,1):F$=MID$(A$(I%),J%+1,1)
 530       E=VAL(MID$(A$(I%),J%+1,1))
 540       IF ASC(F$)>90 THEN E=VAL(MID$(A$(I%),J%+2,1)):J%=J%+1:E$=E$+F$
 550       E1=VAL(MID$(A$(I%),J%+2,1)):W$=MID$(A$(I%),J%+2,1)
 560       IF (W$="0" OR E1<>0) AND E<>0 THEN J%=J%+1:Y$=STR$(E)+STR$(E1):E=VAL
(Y$)
 570       IF E=0 THEN E=1
 580       IF B$(K%)=E$ THEN A(K%+(NE*(I%-1)))=E*U(I%)+A(K%+(NE*(I%-1)))
 590       NEXT:NEXT:NEXT
 600 PROCCount(1,RC,0)
 610 PROCCount(RC+1,V,NE)
 620 IF D=1 THEN 880
 630 T=0:T1=0:O=0:I$=" "
 640 FOR N%=1 TO NE
 650   T=T+T(N%):T1=T1+T(NE+N%)
 660   NEXT
 670 IF T1>=T THEN 710
 680 FOR N%=1 TO NE
 690   IF T(N%)>T(N%+NE) THEN I$=I$+B$(N%)
 700   NEXT:GOTO 740
 710 FOR N%=1 TO NE
 720   IF T(N%+NE)>T(N%) THEN I$=I$+B$(N%)
 730   NEXT:O=1
 740 IF O=1 THEN ST=1:F=RC ELSE ST=RC+1:F=V
 750 GT=0:TT=0:R=0
 760 FOR N%=ST TO F
 770   FOR P%=1 TO LEN I$
 780     FOR Q%=1 TO LEN A$(N%)
 790       X$=MID$(I$,P%,1):Y$=MID$(I$,P%+1,1)
 800       IF ASC(Y$)>90 THEN X$=X$+Y$:P%=P%+1
 810       IF MID$(A$(N%),Q%,1)=MID$(I$,P%,1) THEN TT=TT+1
 820       NEXT
 830     NEXT
 840   IF TT>GT THEN GT=TT:R=N%
 850   TT=0:NEXT
 860 U(R)=U(R)+1
 870 GOTO 470
 880 ENDPROC
 890 DEFPROCCount(START,FINISH,M)
 900 LOCAL W:N=NE
 910 FOR L%=1 TO NE
 920   T=0
 930   FOR K%=START-1 TO FINISH-1
 940     T=T+A(L%+K%*N)
 950     NEXT
 960   T(L%+M)=T
 970   NEXT
 980 D=1:FOR W%=1 TO NE:IF T(W%)<>T(W%+NE) THEN D=0
 990   NEXT
1000 ENDPROC
```

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***Open Forum* is for you to publish your programs and ideas. Take care that the listings you send in are all bug-free. Your documentation should start with a general description of the program and what it does and then give some detail of how the program is constructed. We will pay the *Program of the Week* double our new fee of £6 for each program published.**

Hangman

on Dragon 32

The old game of Hangman is for two players. The first enters a word and the second has to guess it. If an incorrect letter is entered the scaffold starts to build culminating with the figure being hanged to a suitable dirge. When the word is guessed, Yankee Doodle is played.

Program notes

Lines	
110 360	Sets up letters
370 490	Sets up scaffold and man
510 700	Prints title page and plays tune
720 880	Inputs word to be guessed
900 930	Gives audible signal to indicate word cleared from screen
940 1070	Prints screen including number of dashes indicating number of letters in word
1090 1220	Letters are entered & checked to see if they are in the word. Will print them in correct position
1230 1340	Prints part of scaffold if letter not in word
1360 1460	Prints up correct word
1480 1530	Asks if you want another go
1600 1670	Clears the screen

```
10 '################
20 '####HANGMAN####
30 '################
40 '####R.NEWBY####
50 '################
60 CLEAR 700
70 PCLS
80 PMODE 3,1:SCREEN1,0
90 DIM C(56)
100 DIM A$(26)
110 A$(1)="U10E5R5F5D2NL15D8"
120 A$(2)="NR10U15R10F3G4NL9F5G3L1"
130 A$(3)="BM+13,-12;H3L5G5D5F5R5E3"
140 A$(4)="R5NU15R5E5U5H5L10"
150 A$(5)="NR13U7NR13U8R13"
160 A$(6)="U8NR13U7R13"
170 A$(7)="BM+13,-12;H3L5G5D5F5R5E3U2NR2 L3"
180 A$(8)="U8NU7R15NU7D8"
190 A$(9)="R7NR6U15NR6L7"
200 A$(10)="BM+15,-15;L5NL10D12G3L3H3"
210 A$(11)="U8NF8NE6U7"
220 A$(12)="NU15R13"
230 A$(13)="U15F7E7D15"
240 A$(14)="U15F15U15"
250 A$(15)="BM+0,-5;U5E5R5F5D5G5L5H5"
260 A$(16)="U15R10F3D2G3L10"
270 A$(17)="BM+0,-5;U5E5R5F5D5G2NH3NF3G3 L5H5"
280 A$(18)="U7R4NF7L4U8R8F3D2G3L8"
290 A$(19)="R10E5U3L15U2E5R5F3"
300 A$(20)="BM+7,+0;U15NL7R8"
310 A$(21)="BM+0,-15;D10F5R5E5U10"
320 A$(22)="BM+0,-15;D8F8E7U8"
330 A$(23)="NU15E7F7U15"
340 A$(24)="E15BM-15,+0;F15"
350 A$(25)="BM+5,-15;D5F5NG5E5U5"
360 A$(26)="NR15E15L15"
370 DIM B$(12)
380 B$(1)="BM150,185;U20R50D5ND15R2C2ND1
5R5D5R5D5R5D5L17C3L5U5NH10U10L30NG10L10D
15L5U20R5"
390 B$(2)="BM160,165;U60R2C2ND59C3R2C2ND
59C3R1D60"
400 B$(3)="BM175,165;C4H5NG5H5"
410 B$(4)="BM165,110;C3R25U1C2NL24C3U3C2
NL24C3U1L25"
420 B$(5)="BM165,120;C4E5NH5E5"
430 B$(6)="BM182,110;C2D2C4D2C2D2C4D1"
440 B$(7)="BM182,117;C2R3D6G2H2U6R2"
450 B$(8)="BM182,125;C3R4D4L2D4L4U4L2U4R 4"
460 B$(9)="BM186,125;F6G2H4"
470 B$(10)="BM178,125;G6F2E4"
480 B$(11)="BM180,133;C4G10F2E12"
490 B$(12)="BM184,133;C4F10G2H12"
500 GOSUB 1540
510 DRAW"C3S5"
520 C=14:U=160
530 DRAW"BM15,30;"+A$(8)
540 DRAW"BM45,30;"+A$(1)
550 DRAW"BM75,30;"+A$(14)
560 DRAW"BM105,30;"+A$(7)
570 DRAW"BM135,30;"+A$(13)
580 DRAW"BM165,30;"+A$(1)
590 DRAW"BM195,30;"+A$(14)
600 LINE(15,35)-(215,35),PSET
610 DRAW"S4C2"
620 LINE(15,36)-(215,36),PSET
630 DRAW"C4"
640 LINE (15,37)-(215,37),PSET
650 FOR X=1 TO12
660 DRAW B$(X)
670 NEXT
680 PLAY"O3T5EFGEDEGEDCDEFDL2C"
690 FOR X=1 TO1000
700 NEXT
710 GOSUB 1600
720 DRAW"C2"
730 DRAW"BM10,40;"+A$(5)+"BM30,40;"+A$(1
4)+"BM50,40;"+A$(20)+"BM70,40;"+A$(5)+"B
M90,40;"+A$(18)+"BM130,40;"+A$(23)+"BM15
0,40;"+A$(15)+"BM170,40;"+A$(18)+"BM190,
40;"+A$(4)
740 DRAW "S2"
750 DRAW"S4C3"
760 N=10
770 M=100
780 X$=INKEY$
790 IF X$="" THEN 780
800 IF PEEK(338)=191 THEN 890
810 IF ASC(X$)>=65 AND ASC(X$)<=90 THEN
820 ELSE GOTO 780
820 DRAW"BM"+STR$(N)+","+STR$(M)+";"+A$(
(ASC(X$)-64))
830 SOUND 150,1
840 N=N+20
850 IF N=230 THEN M=M+20:N=10
860 D$=D$+X$
870 IFLEN(D$)=26 THEN 890
880 GOTO 780
890 GOSUB 1600
900 FORX=1TO50 STEP 10
910 FOR XI=X TO X-10 STEP-1
920 SOUND X,1
930 NEXT X1,X
940 DRAW "C2"
950 DRAW"BM10,40"+A$(5)+"BM30,40"+A$(14)
+"BM50,40"+A$(20)+"BM70,40"+A$(5)+"BM90,
40"+A$(18)+"BM130,40"+A$(12)+"BM150,40"+
A$(5)+"BM170,40"+A$(20)+"BM190,40"+A$(20
)+"BM210,40"+A$(5)+"BM230,40"+A$(18)
960 LINE(10,185)-(132,140),PSET,B
970 DRAW"C3"
980 PAINT(15,150),4,2
990 LINE(9,186)-(134,139),PSET,B
1000 N=10
1010 M=70
1020 DRAW"C4"
1030 FOR X=1 TO LEN(D$)
1040 LINE(N,M)-(N+15,M),PSET
1050 IF N=210 THEN M=M+23:N=10  :GOTO 1070
1060 N=N+20
1070 NEXT
1080 DRAW"C3"
1090 T=0
1100 B=0
1110 X$=INKEY$
1120 IF X$="" OR X$=" " OR X$=CHR$(13) T
HEN 1110
1130 IF ASC(X$)=>65 AND ASC(X$)<=90 THEN
 GOTO1140 ELSE GOTO1110
1140 A=0
1150 N=10:M=65
1160 FOR X=1 TO LEN(D$)
```

```
1170 IF MID$(D$,X,1)=X$ AND C(X)=1 THEN
GOTO 1110
1180 IF MID$(D$,X,1)=X$ AND C(X)<>1 THEN
 DRAW"BM"+STR$(N)+","+STR$(M)+";"+A$((AS
C(X$)-64)):A=1:T=T+1:C(X)=1
1190 IF N=>210 THEN M=M+25:N=10:GOTO 121
0
1200 N=N+20
1210 IF T=LEN(D$) THEN GOTO 1460
1220 NEXT X
1230 SOUND 150,1
1240 IF T=LEN(D$) THEN GOTO1460
1250 IF A<>1 THEN B=B+1 ELSE GOTO1110
1260 DRAW B$(B)
1270 DRAW"C1"
1280 IF C>122 THEN U=U+20:C=14
1290 DRAW"BM"+STR$(C)+","+STR$(U)+";"+A$
(ASC(X$)-64)
1300 C=C+20
1310 DRAW"C3"
1320 IF B=12 THEN 1330 ELSE GOTO 1110
1330 DRAW"S2BM190,120;C3"+A$(1)+"S3BM205
,123;C2"+A$(7)+"S4BM225,125;C4"+A$(8)
1340 PLAY"T101L+B-L+AL2D"
1350 GOSUB 1600
1360 DRAW"C3BM10,70"+A$(20)+"BM30,70"+A$
(8)+"BM50,70"+A$(5)+"BM90,70"+A$(23)+"BM
110,70"+A$(15)+"BM130,70"+A$(18)+"BM150,
70"+A$(4)+"BM190,70"+A$(23)+"BM210,70"+A
$(1)+"BM230,70"+A$(19)
1370 N=10 :M=130
1380 FOR X=1 TO LEN(D$)
1390 DRAW"C4"
1400 DRAW"BM"+STR$(N)+","+STR$(M)+";"+A$
(ASC(MID$(D$,X,1))-64)
1410 IF N>=210 THEN M=M+20:N=10:GOTO 1440
1420 PLAY"T8004CEDFEDEFEECAB"
1430 N=N+20
1440 NEXT X
1450 GOTO 1470
1460 PLAY"V30T1003L2CCDECEL1DL2CCDEL1CO2
BO3L2CCDEFEDCO2L2BGABO3L1CC"
1470 GOSUB 1600
1480 DRAW"C2BM15,50"+A$(1)+"BM45,50"+A$(
14)+"BM75,50"+A$(15)+"BM105,50"+A$(20)+"
BM135,50"+A$(8)+"BM165,50"+A$(5)+"BM195,
50"+A$(18)
1490 DRAW"BM40,90"+A$(7)+"BM60,90"+A$(15
)+"BM100,90;C3"+A$(25)+"BM120,90;C2E15;B
M140,90;C4"+A$(14)
1500 X$=INKEY$
1510 IF X$="Y" THEN RUN
1520 IF X$="N" THEN CLS:END
1530 GOTO 1500
1540 DRAW"C4":LINE(1,191)-(254,1),PSET,B
1550 DRAW"C2"
1560 LINE(2,190)-(253,2),PSET,B
1570 DRAW"C3"
1580 LINE(4,189)-(251,3),PSET,B
1590 RETURN
1600 DRAW"C1"
1610 POKE65495,0
1620 FOR X=5 TO187
1630 DRAW"C3":LINE(6,X+1)-(249,X+1),PSET
1640 DRAW"C1":LINE(6,X)-(249,X),PSET
1650 NEXT X
1660 POKE 65494,255
1670 RETURN
```

Hangman
by R Newby

Key Bleeper

on BBC

This program enables any BBC micro with operating system 1.0 or above to produce a bleep when a key is pressed. The program works by first using the three FX calls to set the voice, duration and pitch of the VDU7 bleep.

The machine code part simply alters the vectored jumps of the OSWRCH write character routine at &20E and &20F to jump to &DOO the location of the routine which produces the bleep. The accumlator is pushed on to the stack, which contains the ASCII code of the letter to be printed, then the accumulator is loaded with 7, the code for a bleep. Then a jump to subroutine is made to &EOA4 (the actual address of OSWRCH). Then the code for the letter is pulled off the stack and a direct jump is made to &EOA4.

*FX211, 1 Sets VDU7 bleep to channel 1
*FX213,200 Sets bleep to pitch 200
*FX214,1 Sets bleep to duration 1
CALL&8000 is the equivalent of *New*

```
   10*FX211,1
   20*FX214,1
   30*FX213,200
   50P%=&0D00
   60[OPT2
   70PHA
   80LDA#7
   90JSR&E0A4
  100PLA
  110JMP&E0A4
  120]
  140?&20E=0
  150?&20F=&0D
  160CALL&8000
>RUN
>
>O.
>
>RUN
0D00           OPT1
0D00 48        PHA
0D01 A9 07     LDA#7
0D03 20 A4 E0  JSR&E0A4
0D06 68        PLA
0D07 4C A4 E0  JMP&E0A4
```

Key Bleeper
by Philip Venables

Nasties

on Spectrum

This program is written in *Basic*, although a machine code routine has been used to produce some good sound effects. The programme is not very long so the game is fast. Full instructions are included in the programme.

Variables used

HS —High score
SC —Score
F —Vertical position of alien
P —Horizontal position of alien
S —Colour of alien
A —Horizontal position of player

Graphic symbols A and B have been used for the two types of alien.

Line	
35	A
40	B

```
   1 REM ************************
        **** N A S T I E S ****
        **** © Andrew Filby****
        ************************
  10 LET HS=0: GO SUB 9000: LET
A=15
  15 GO SUB 8000
  20 LET SC=0: BRIGHT 1: PAPER 0
 INK 0: BORDER 1: CLS
  21 PRINT AT 15,A; INK 2;"■";
  22 PRINT AT 21,0; PAPER 6; INK
 2;"▬▬▬▬▬▬▬▬▬▬▬▬▬▬▬▬▬▬▬▬▬▬▬▬▬▬▬▬▬▬▬▬"
  23 PRINT AT 0,0; PAPER 1; INK
7;"SCORE:0      "; FLASH 1;"NASTI
ES"; FLASH 0;"      HI:";AT
0,27; INK 6;HS
  30 RANDOMIZE : LET S=INT (RND*
5)+3
  35 LET A$="✱"
  40 IF S>6 THEN LET A$="✱"
  50 LET P=INT (RND*32)
  60 FOR F=1 TO 20
  65 IF ATTR (F,P)=66 THEN GO TO
 500
  70 PRINT AT F,P; INK S;A$;
  80 LET Z$=INKEY$: IF Z$<>"" TH
EN PRINT AT 15,A;" ";: LET A=A+(
Z$="8" AND A<31)-(Z$="5" AND A>0
): PRINT AT 15,A; INK 2;"■";
  90 BEEP .004,F*2
  95 IF ATTR (F+1,P)>66 THEN GO
TO 400
 130 PRINT AT F,P;" ";
 200 NEXT F
 300 GO TO 30
 400 POKE 32504,70: POKE 32503,1
00: POKE 32506,2: POKE 32525,29:
 RANDOMIZE USR 32501: POKE 32525
,28: RANDOMIZE USR 32501
 405 IF F<>15 THEN GO TO 30
 410 POKE 32504,100: POKE 32503,
100: POKE 32506,20: POKE 32525,2
8: RANDOMIZE USR 32501: POKE 325
25,29: RANDOMIZE USR 32501
 450 IF SC<HS THEN GO TO 480
 460 PRINT AT 5,5; PAPER 6; INK
0;"YOU HAVE A HIGH SCORE!": LET
HS=SC
 480 PRINT AT 10,6; PAPER 7; INK
 2;"PRESS ANY KEY TO PLAY"
 481 IF INKEY$="" THEN GO TO 481
 482 BEEP .01,40
 490 GO TO 20
 500 POKE 32503,180: POKE 32506,
2: POKE 32525,28: RANDOMIZE USR
32501
 501 LET SC=SC+5: PRINT AT 0,6;
PAPER 1; INK 7;SC;" ";
 505 IF S<>7 THEN GO TO 30
 510 POKE 32504,100: POKE 32503,
100: POKE 32506,9: POKE 32525,28
: RANDOMIZE USR 32501: POKE 3252
5,29: RANDOMIZE USR 32501
 520 LET SC=SC-50: PRINT AT 0,6;
 PAPER 1; INK 7;SC
 530 GO TO 30
8000 PAPER 1: INK 7: BORDER 1: C
LS
8010 PRINT AT 0,5; INVERSE 1;"NA
STIES-© Andrew Filby"
8020 PRINT '"The object of the g
ame is to    stop the nasties fr
om hitting   the ground,if you d
o not catch  the nasties then th
ey will      collect on the grou
nd.If a pile of nasties reaches
the height ofyour scoop you loos
e."
8030 PRINT '"The nasties that  a
re caught areworth 5 points each
 (✱),but the white nasties(✱) ta
ke 50 point  away from you."
8040 PRINT '"Use'5' for left and
 '8' for right"
8050 PRINT AT 18,5;"Press any ke
y to start"
8060 IF INKEY$="" THEN GO TO 806
0
8070 BEEP .01,10: RETURN
9000 PRINT AT 10,5;"Please wait
a moment"
9001 FOR F=144 TO 145: FOR G=0 T
O 7: READ A: POKE USR CHR$ F+G,A
: NEXT G: NEXT F
9010 DEF FN A(N)=(CODE A$(N)-48
AND CODE A$(N)<58)+(CODE A$(N)-5
5 AND CODE A$(N)>64)
9011 LET A$="F3111000260A3A485C1
F1F1F0EFEEE10ED794310FE2520F41C1
520E8FBC9"
9012 FOR F=1 TO LEN A$ STEP 2: P
OKE 32500+F/2,16*FN A(F)+FN A(F+
1): NEXT F
9100 RETURN
9900 DATA 102,36,60,90,126,189,3
6,102,129,66,126,60,231,60,36,10
2
```

Nasties
by Andrew Filby

Citadel

on Vic 20

This is a game for a Vic with Super Expander. The player has to defend the citadel from flames, which fall from the sky. To stop the flames, there is a magic shield, which can be put below the flames by use of the joystick. However, if the joystick is not constantly moved from left to right, the shield will shrink and fall.

Program notes

0-70	Define constants
100-295	Move and draw shield
300-400	Select and move flame
410-610	End Sequence
800-990	Unplot old & make new flame
1000-1800	Draw citadel
1850-2999	Define initial variables

```
0 REM CITADEL
1 REM BY STEPHEN LOUGHRAN
10 COLOR14,5,1,0
20 DEF FNR(Z)=INT(RND(1)*Z)
30 N=5:REM NO.OF FLAMES
35 REM PIXEL DECAY RATE
40 NX=2:NY=1
50 GOSUB1000
70 TI$="000000"
90 REM MAIN LOOP:-
100 R=RJOY(0):OW=W:OY=Y
110 IF(RANDJ)=0THENW=W-NX:Y=Y+NY:GOTO250
120 IFRAND3=0THEN200
140 IFRAND1ANDY>0THENY=Y-PD
150 IFRAND2ANDY<700THENY=Y+PD*2
200 W=W+HD
210 IFW>260THENW=260
220 J=J*2:IFJ=16THENJ=4
230 IFY<0THENY=0
250 SOUND0,128+W/2.1,128+(700-Y)/5.5,0,15
270 IFY>700THENY=700
280 DRAW0,B-OW,OYTOB+OW,OY
290 DRAWS,B-W,YTOB+W,Y
295 IFW<1THENW=1
300 F=FNR(N)
305 P=X(F):Q=Y(F)
310 IFP=0ANDQ=0ORRDOT(P,Q)<>FCTHEN800
330 Q=Q+PD
340 P=P+V(F):IFP>KORP<0THEN800
350 IFRDOT(P,Q)<>SCANDRDOT(P,Q)<>FCTHEN400
360 POINTFL,P,Q
370 X(F)=P:Y(F)=Q
390 GOTO100
400 IFQ<700OR(Q>700AND(P<290ORP>742))THE N800
```

Open Forum

```
410 REGION0:SOUND0,0,0,190,15
420 CHAR0,0,"YOU LOST IN
430 V=VAL(RIGHT$(TI$,2)):IFVTHENT$=MID$(
STR$(V),2)+" SECOND":IFV>1THENT$=T$+"S"
440 V1=VAL(MID$(TI$,3,2))
450 IFV1THENM$=MID$(STR$(V1),2)+" MINUTE
":IFV1>1THENM$=M$+"S"
460 IFV1>0ANDV>0THENM$=M$+"."
470 CHAR1,0,M$+T$
480 REGIONFCOR8
490 BO=RCOLR(1)
500 FORI=0TO100STEP25
510 CIRCLEFL,X(F),Y(F),I*.7,I
520 NEXT
550 FORI=15.99TO0STEP-.05
555 COLOR SC,BO,FC,I
560 SOUND0,0,0,190,I
570 NEXT
600 GETA$:IFA$=""AND(RJOY(0)AND128)=0THE N600
610 GRAPHIC0:RUN
799 END
800 REM UNPLOT FLAME
810 C=X(F):D=V(F)
815 IFC=0ANDY(F)=0THEN830
820 FORE=Y(F)TOOY(F)STEP-PD:POINT0,C,E:C
=C-D:NEXT
830 IFFNR(10)>0THEN900
840 G=FNR(N):IFG=FTHEN840
850 X(F)=X(G):Y(F)=Y(G)
860 V(F)=(FNR(12)-4)*H:IFV(F)=V(G)THEN86 0
870 GOTO940
900 REM NEW FLAME
910 X(F)=FNR(160):Y(F)=FNR(300):V(F)=(FN
R(12)-4)*H
920 IFX(F)<10ORX(F)>150THENY(F)=FNR(700)
930 X(F)=X(F)*HD
940 POINTFL,X(F),Y(F)
950 OX(F)=X(F):OY(F)=Y(F)
990 GOTO100
1000 REM  INIT
1010 GRAPHIC3
1060 REGIONRCOLR(2)OR8
1090 K=1023:B=512
1100 DRAW1,0,KTO290,885
1110 DRAW1,745,885TOK,K
1200 CIRCLE3,500,0,730,950,20,30
1300 PAINT1,B,K
1350 DRAW3,290,885TO290,800
1360 DRAW3,745,885TO745,800
1370 CIRCLE3,500,0,730,850,20,30
1400 PAINT3,500,900
1410 CIRCLE3,580,1510,730,745,69,79
1480 D=3
1490 POINT3,290,800
1510 READX,Y
1520 IFX=-9THEND=Y:GOTO1510
1530 IFX>=0ORY>=0THEN:DRAWDTOX+295,850-Y
:GOTO1510
1600 DATA0,90,10,140,20,90,20,48
1610 DATA40,48,-9,2,70,48,70,68,80,68,80
,48,130,48
1620 DATA130,20,40,48,130,20,-9,3
1630 DATA140,20,140,150,160,150,-9,1,160
,130,145,130,150,140
1640 DATA140,150,-9,3,140,20,170,13
1650 DATA-9,2,220,160,180,13,210,13,220,
160,220,13
1660 DATA230,13,240,160,260,13,270,13,28
0,13
1670 DATA-9,3,280,70,390,70,390,60,-9,2,
290,60,290,50,-9,3,390,50
1680 DATA390,40,-9,2,270,40,290,30,-9,1,
390,30
1700 DATA-9,3,200,-100,-9,0,250,-130,150
,-140
1710 DATA300,-150,100,-160
1720 DATA400,-170
1800 DATA-1,-1
1850 FL=2:S=3
1860 J=8
1870 PD=7:HD=PD*2
1880 FC=RCOLR(FL)AND7:SC=RCOLR(0)
1890 H=PD/3
1900 Y=690
1910 POINTS,B,Y
1930 DIMX(N),Y(N),V(N),OX(N),OY(N)
1940 W=50
1950 DRAWS,B-W,YTOB+W,Y
2999 RETURN
```

Citadel
by Stephen Loughran

Microradio

GW6JJN



Data repeater

This week Microradio moves to Leicestershire to find the latest breakthrough in the world of Radio-computing. The Leicester Repeater Group, known more usually as GN3CF, has just announced the imminent arrival of an amateur data repeater with the callsign GB3GD. It is to be located at a site near Leicester and has been built and financed by radio amateurs. It is the first of its kind and will be able to handle two code formats of ASCII as well as normal RTTY.

The repeater will regenerate incoming signals, instead of the usual method of simply relaying them. This means that when an amateur with his computer accesses the repeater, his signals will be decoded automatically and then re-encoded and transmitted by the logic at the site. Strong and accurate signals will then be transmitted and will cover most of East Central England on the 70cms UHF amateur frequency.

There will also be a crosstalk facility which means that RTTY will be converted to ASCII and vice versa. This has the effect that people with RTTY can talk to people using just a computer and a computer user can communicate with a station having only radio teletype equipment and no computer. The group feel that this facility will make for a closer bond between the computer user and the traditional teletype operator. In addition to this mode, there will be two RTTY baud rates and four ASCII baud rates. There will be a HELP facility which will cause the repeater to send information regarding the modes available and it is hoped to add at a later date a bulletin board and a computing and information service.

It may be possible to give the repeater some real computing power so that it can be accessed and programs can be run. This brings us closer to the possibility of intelligent repeaters and packet radio.

The logic system of the data repeater GB3GD will be based on a Z80 microprocessor and the group are anxious to hear from people who want to use the repeater, people who want more information and any ideas regarding new modes etc. Contact them by sending a SAE to GB3CF, PO Box 180, Leicester.

It is worth adding at this point that the GB3CF group who built and maintain the famous Charlie Fox repeater are also responsible for GB3GV which is a video repeater for television pictures which has recently come into service as well as a couple of microwave beacons.

Hopefully, the data repeater will be in operation when you read this. If it is not, then it's not because it isn't ready but because the licence hasn't arrived from the Dept of Trade and Industry. It seems that the only thing that holds back the technology these days is the filling in of forms.

Ray Berry GW6 JJN

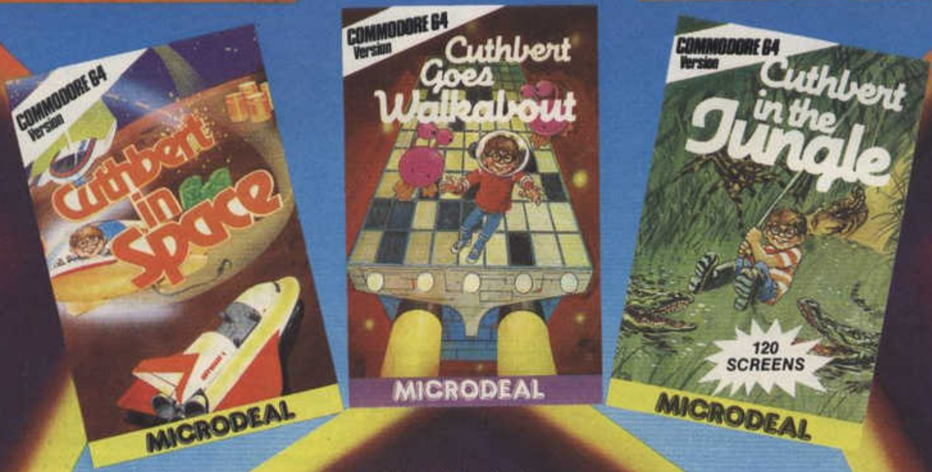
This series of articles is designed for radio and microcomputer enthusiasts alike. If you have any queries that you want answered, hints and tips to share, or topics that you would like to see covered, write to: Ray Berry, Microradio, *Popular Computing Weekly*, 12-13 Little Newport Street, London WC2R 3LD.

NOW AT LAST!

Cuthbert

ON THE

Commodore 64



Yes at last those fantastic top selling games for the Dragon are now available for your Commodore 64. Avoid those Marauding Moronians in "Cuthbert Goes Walkabout". Fight for survival in "Cuthbert in the Jungle"or plunder the Moronians planet in "Cuthbert in Space". These great games are a "must" for your software collection.

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Tony Bridge's Adventure Corner



Happy birthday!

The Grand Elf's first birthday passed without mention a couple of weeks ago — not even a card! Oh well!

In the first year of the Adventure Corner, a lot of changes have been seen. 1983 has to be the Year of *The Hobbit* as far as I am concerned — this is the program that, in my opinion, changed the face of computer-adventuring more than any program since Scott Adams' *Adventureland* and before that, the original *Colossal Cavern*. In a moment we'll get on to the Hobbit book, but first, let's take a look at *Knight's Quest*, by Phipps Associates.

Regular readers may know that this is a particular favourite of mine — whereas *The Hobbit* was revolutionary in bringing sophisticated graphics and language analysis to the popular microcomputer, *Knight's Quest* was the first of the many programs to simplify the approach, and use the techniques in a less complex fashion.

A lot of the pleasure to be gained from K's Q, for me, is the way in which the game grows from a rather innocuous beginning, which may put many people off, to a rich and complex middle and endgame.

A few weeks ago, I looked at some of the opening problems that hold people up. Although it may seem, at times, as if the whole adventure is going to revolve around how to get through the narrow cleft in the rocks, or how to get across the river, this is only scratching the surface.

Guy Nash is having trouble with the grate, which is very early on — try saying *Prise*, Guy! Tommy Agersnap writes to me from Denmark, asking for help in the wasteland. Paul Larcher's mum, is also having trouble there:

"My mother has really got interested in adventure games on my Spectrum (I'd rather have arcade games!). She loves *The Hobbit* and others, but she doesn't seem to be moving anywhere in *Knight's Quest*. She has the Dragon following her, the book of Spells, and the Dwarf as Squire, but she can't get to any location but the wastelands and can't get on with the adventure. Can you help, please?"

K'sQ is a good one to start with, Paul, as it contains many of the problems that you will meet in other adventures. First of all, Mum, try taking another look at that book — it might give you an idea! To cross the river, you will have to get rid of the Dragon — some time ago, I recommended killing it, but I've since found, after reading the Book of Spells, that the Dragon can be put to much better use. Have you managed to explore the location on the other side of the narrow cleft? There you will find, in a casket, the Magic Compass. Now proceed to the wastelands.

You must make a map as you move around, and, if necessary, drop some of the objects that you are carrying, in various places. This will prevent you from going round and round in circles, as you will come across those objects from time to time. There are a couple of objects that you will need to keep with you, the compass being one. This, when you get to the final location in the wastelands, will come to life and give you instructions for your next move. Obey them and you're through! The maze of the wastelands is not randomly generated, so your map will hold good for future games.

More on K's Q next week.

Last week, I mentioned the new book from Melbourne House, *A Guide to Playing the Hobbit* by David Elkan (see below). I have since received a pre-publication copy, and it will be everything that a frustrated Hobbit will want. It is quite slim (only 75 pages in all), but contains details of every location, along with the illustrations and hints on how to tackle the various puzzles.

The book is divided into three sections: the first is a general guide to playing the adventure, with advice on making maps, reacting with all the various characters, etc.

The next part shows you how to interpret the *Help* clues given to the player throughout the course of the game (the clues here are given, largely, in a "letter-substitution" code, a method which will be familiar to Corner readers!), while the third part is a full reference section listing all the locations, their exits and any other commands you may need to pass certain obstacles.

So, this book can be used in a multitude of ways. Newcomers to *The Hobbit* can dip into the text, confident that they will gain useful advice that will not detract from the playing of the classic — while adventurers who may be stuck (in the Goblin's Dungeon?) will find just enough help to nudge them on their way again.

Although short references are made to the behaviour of some of the characters, I would have liked to have seen more detailed discussion on the playing of the adventure — many people, ask, for instance, "What is the use of the Golden Key?" and similar questions — a section on various Hobbitbugs would also have been welcome.

This series of articles is designed for novice and experienced Adventurers alike. Each week Tony Bridge will be looking at different Adventures and advising you on some of the problems and pitfalls you can expect to encounter. So, if you have an Adventure you want reviewed, or if you are stuck in an Adventure and cannot progress any further write to: Tony Bridge, Adventure Corner, *Popular Computing Weekly*, 12-13 Little Newport Street, London WC2R 3LD.



50 BOOKS TO BE WON!

Enter our competition by answering the questions below and win a copy of *A Guide to Playing The Hobbit*, by David Elkan published by Melbourne House. When you have answered the questions, fill in the coupon and send it together with last week's coupon to *PCW*, 12-13 Little Newport St., London WC2 3LD by 10 May 1984. The first 50 correct entries will receive a copy of the book.

1. What is Durin's Day?
2. What is Thorin's last name?
3. Where does Elrond live?
4. What is Gollum's birthday present?
5. What is the answer to this riddle: 'A box without hinges, key or lid, Yet golden treasure inside is hid'
6. Where does Gandalf's cousin, Radagast live?
7. Why did Bilbo name his sword Sting?
8. What is the name of Thorin's father?
9. What is the necklace of Girion, Lord of Dale, made from?
10. What was laid on Thorin's tomb?

RULES

1) Each entry must consist of two coupons.
2) Answers must be on a separate sheet of paper.
3) No correspondence will be entered into.
4) All entries must be received by the closing date, 10 May, 1984.

Hobbit Competition (2)

Name ....

Address..

....

....

Peek & Poke



MIND THE GAP

Richard McCarthy of Llantrithyd, nr Cowbridge, South glamorgan, South Wales writes:

Q I have just finished only half of a game program I have invented, because after 65000 for a line number I get a message *Syntax Error*. I think this is terrible because it means you cannot do very big programs on the Vic. Can I change this?

A I am wondering if you are not getting a little confused. What size gaps are you putting between your line numbers? If you are using a thousand, then this is much too big. Try a hundred, though again, most people would consider this far too high.

Whatever problems with the Vic's memory mapping there might be, I think the situation is not as bad as you suggest. No home computer at all could have a big program by these standards, unless they were equipped with banked switching and a large amount of extra RAM. If, for example, you reduced your gaps to a hundred, and used 650 lines, the line numbers would take 12K alone — each address is made up of two bytes. You do not say what size memory expansion you have on your computer, but even if it is 32K this is a large amount to lose in line numbering. Perhaps you do not realise that every single number from 1 to over 64000 can in theory be used. Gaps are only left in programs to make design changes simpler.

The limit of addressing is decided initially by the CPU, on all the common home computers this is 65,535. I would suggest that you keep all the gaps in your line numbers to fifty. This should still be more than enough, and will mean that you will run out of Ram, long before you run out of possible line numbers.

OVER IN A FLASH

Philip Smith, of 16 Belmont Close, Green Lane, Clifton, York YO3 6QR, writes:

Q While constructing a maze program for my Spectrum, I came across an annoying bug. When the character came in line with maze graphics, the graphics started flashing. Could you tell me how to get around this?

A The first thing is that this is no bug. It's caused by use of the *Over* command. When you are printing your character, I presume that you are using *Print At x,y;Over 1;* etc. . . . this will cause a flashing effect.

The only way of getting around this problem is either to avoid printing on top of your maze graphics (ie, not let your character move onto it), or not to use overprinting.

IS IT LEGAL?

Michael Stewart of Leeds Road, Bradford, writes

Q Am I within the law, swapping commercial programs, in return for others, offered in your classified columns?

A It all depends on how the word trade might be defined in court. On the one hand, many cassettes cannot be sold, lent or hired by way of trade. Barter, when you exchange cassettes, is a form of trade. On the other hand though, the cassette is your own private property, and you may do with it as you wish. If you choose to give it to someone, who in turn chooses to give you something in return, then gifts (at this level), are not illegal, nor liable to such things as capital transfer tax.

In practice I would doubt that you would get into trouble for simply swopping a cassette you have bought for another. However that means what it says, you must have bought it, and more importantly, the program that might be on it. If you have not then you are swopping a product that does not belong to you in the first place. That is plainly illegal, and would make you liable to penalties under the copyright acts. If you have, for some reasons, bought or swopped an illegal tape, then that is also a crime — even if you did so in good faith.

BLOWING BUBBLES

Phil Strike of Elvedon Way, Maidenhead, writes:

Q I see, from time to time, references to Bubble Memory. I gather that it has not lived up to early expectation, and will not be readily available for home micros, (I now have a Dragon 64, which is enough new technology to last me a life time). However, would it be possible for you to explain to me what I, and presumably other home users are missing, by not having 'Bubble Memory'?

A Bubble memory was the great revolution in data storage that never quite happened, or at least not to date. The theory and the advantages are sound enough, what has let this form of storage down so far is the practical technology. It is expensive to produce the various driver circuits necessary.

Strictly speaking, Bubble is magnetic data storage media, like tape or a disc, although it looks more like a chip. It works on the theory of magnetic domains or 'bubbles' that are created when special areas have their magnetic fields aligned in the opposite direction to a prevailing ones. These are the domains or bubbles and there are thousands of them to the inch. The bubbles are part of a slice of what is, in effect, magnetic tape. Over this is a film, and a series of metal tracks, that control the magnetic fields. You can think of the memory as the shunting of a large number of data trains around numerous loops of track.

Reading the data has to be done sequentially and is determined by the presence of a bubble at a particular place on the loop: yes equals Binary 1, no equals Binary 0. Essentially it is a serial system.

Bubble memory is potentially much faster than Ram but the technology of reading it at the rate it is moved is not yet available so in practice it is much slower and more expensive.

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```
10         LD     HL,#4000
20         LD     BC,#1800
30   LOOP  LD     A,(HL)
40         XOR    # FF
50         LD     (HL),A
60         DEC    BC
70         IMC    HL
80         LD     A,B
90         OR     C
100        JR     NZ,LOOP
110        RET
```

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FOR HIRE

HIRE A COMPUTER from ZX81 upwards for a week or a year. We also buy and sell second-hand computers, magazines and books. Business and Computer Services, 294a Caledonian Road, London N1 1BA. Tel: 01–607 0157.

Computer Swap 01-437 4343

Free readers entries to buy or sell a computer. Ring 01-437 4343 and give us the details.

Spectrums for sale

48K SPECTRUM, printer, Kempston joystick and Interface, 8 original games inc. Zeus Assembler and Guides. £195.00. Tel: Saundersfoot 812187.

SPECTRUM SOFTWARE — originals. Kong (Ocean), £2.95, flight simulation £3.50, sofkit 1 £2.50, timegate £1.95, Psst £2.95, Speakeasy £1.95. The Hobbit £4.95, games 2 (Sinclair) £1.00. Tel: Falkirk 0324-20275.

SPECTRUM 48K with tape recorder, bargain at £80 with ten month guarantee. Phone Nick on Sheffield (0742) 22760.

48K SPECTRUM with Printer + s/w. Tel: 2128 after 5p.m.

48K SPECTRUM, Printer & paper £400 of s/w. £250. ono. Could sell separately. Tel: White Abbey 60032.

Z× 80 with 8K rom, manual 2 books & cassette £190 ono. Tel: Huddleton-on-Sea 2128.

S/W FOR SALE — for Spectrum all various inc: Hobbit, Death Chase, from £300. Tel: 0703 767580.

SPECTRUM 48K cassette recorder, joystick, printer 100 & games Pascal, Forth, and more. Colour T.V. cassette cabinet mags etc. £300. ono. Tel: 0268555372.

SPECTRUM games- excellent sale — Valhalla £9.00 halls of things £4.00 zip zap £3.00 jetpac £3.00 psst £3.00. Phone Mayfield 972048 (Robert).

ZX Spectrum issue 2, 16K plus micro speech, 30 mags, books and softwares, all in good condition. Will accept £110 or less. Tel: 01 609 7197.

SPECTRUM 48K Printer, carry case etc., very quick sale wanted at £80. Tel: Nottingham (0602) 324166 (ask for Julian).

48K SPECTRUM 9 months guarantee plus ZX Printer. 5 rolls and protek interface and quickshot plus many games excellent cond., £250. Tel: B'Hills 378034 after 5p.m.

SPECTRUM GAMES for sale, all originals, only a month old. Bear Rovver, Mr. Wimpy, Maziacs, H.O.T.T. £3.95 each. Cyber Rats, £2.95. Send Monex/Cheque to P. Roberts, lower Ledicot. Shobdon.

SPECTRUM PRGRAMMABLE Cambridge Joystick and interface, brand new, unused, £24 ono. Was duplicate present. Works with any games. Two independent fire buttons. Also for sale, original software half price. Phone 0481-23390 evenings.

ORIGINAL SPECTRUM games. Manic Miner, Chickie, Snooker, Jetpac, ZZoom, Alchemist, £350. River Rescue, Train Game, Freez Beez, £300. All good condition. Tel: 0524 762 217 evenings. I pay. postage.

Ataris for sale

ATARI VCS for sale, six games, Combat, Air Sea Battle, Asteroids, Missile Command, Night Driver, Dodge 'Em. If interested ring 853 4261 after 4pm Mon to Sat. £50 ono. 8534261.

ATARI 400 16K with cassette recorder, joysticks, manuals, Basic, Star Raiders, Defence, Missile Command, Space Invaders, Diamonds. Swap for CBM 64 or sell for £200. Tel 01-609 1962 after 6pm.

Bold Type ATARI s/w inc: Pacman, Centypede, Star Raiders. Cartridges £12 each, Scot Adams Adventures 24K memory, Account, Voodoo Castle, and Mission Impossible £10 each. Tel: 01-524 6035.

ATARI 400 + tape recorder + joystick. Inc: Over 150 programs £150. Or swop for Color Genie. Tel: Wakefield 822543.

ATARI 600XC £200 of s/w, cassette deck, joystick £250 or swop for CBM 64. Or BBC model B. Tel: Nottingham (0602) 322741.

ACORNSOFT GAMES for sale. All orignals. Rocket Raid, Starship Command, Meteors, Sphinx Adventure, Super Invaders £5.50 each. Planetoid £4.50 will also consider swapping for other original BBC games. (0259) 60529.

BBC MODEL A 32K plus via. All leads and manuals included much software. Condition as new. £275 ono. Tel: Billericay 51428.

Tandys for sale

48K AQUARIUS for £32. Tel; 0555 715402.

TANDY CGP-115 Printer. Excellent condition, complete with two spare rolls of paper and new pens. Ideal for Dragon, Tandy, etc £90. Tel (0202) 692633 after 6pm.

TANDY Co-Co 16K extended Basic cartridge and cassette software, joysticks, cassette recorder, books £130. Tel Woodbury 68756.

AQUARIUS computer, data recorder, and one game Astrosmash. Brand new hardly used £76.00 ono. with operating instruction. Tel: 01-800 6227.

Video Genie 32K Acucab floppy tape system, Printer interface. Light pen, various books and software £200. 0923-27093.

ZX81s for sale

ZX81 16K RAM £20 worth of games. Books. vgc. £45 ono, or swap for VIC-20. Ring Pete on 524/3032.

16K RAM pack for ZX81, only £8.50. Contact A. Berry, 92 Chester Road North, Sutton Coldfield, B73 6SL.

ZX81 16K, 4 computer tapes, £35. Tel: 0403 50*70.

Commodores for sale

VIC 20 game cartridges: Jupiter Lander, Menagerie, Mole Attack, Omega Race. Only 2 months old, some never opened! £6.00 each. Also Wacky Waiters and Wizard and Princess. £3.50 each. Tamworth 60276.

VIC 20 + C2N Cassette unit + many mags. £80. Tel: Huddersfield (0484) 852 853 after 6pm.

COMMODORE CASSETTE unit interface. Save, and Load programs onto any cheap recorder with this interface. Reliable — just plugs in. 3 months old. Suitable Pet, Vic, CBM 64. Accept £12.50 ono. (0244) 675717.

COMMODORE VIC 20 + cassettes unit. Games, Blank tapes, ref books 3 weeks old. 1 year guarantee, boxed v.g.c. £150. Tel: Princes Risborough 6922.

SIMONS BASIC cartridge for CBM 64. £35.00. Tel: Bracknell 489173 (eves).

COMMODORE BARGAINS! For Vic 20. Voodoo Castle, Adventure cartridge only £7. Avenger cartridge (fully operational and totally reliable but slightly damaged) £4. Phone now! 0558 822509.

C54 SOFTWARE Simons Basic unopened £40. CBM. Educational software £5 each. CBM Assembler tutor £20. Tape copier £3.50. Computer reset £5.50. Dr Watsons Assembler tutor £9. Tel: 0222 865067.

COMMODORE 64 + C2N, books, manual, programmer's reference guide, tapes, (including Assembler + 3 Llamasoft games), Quickshot Joystick, dust cover. Original boxes. £295 or best offer. Buyer collects. Phone 01-961 6032 anytime.

VIC 20, C2N, 16K, Super Expander 4 slot switchable Motherboard and 2 cartridges for sale. Includes lots of software and introduction to Basic with programmers reference guide, and magazines. Only £210. Buyer collects.

VIC 20 cassette deck, 16K, super expander, speech synthesiser, 6 games cartridges, 19 games. Loads of books, as new. All in boxes. Worth £500.00. Sell for £250.00. Tel: Southend 68904 after 6pm.

VIC 20 software, Mole Attack, Omega Race, Avenger, Road Race, Jupiter Lander, Voodoo Castle for £5 each! Also cassettes, Matrix, Laserzone, Gridrunner etc. For £4ea. Phone 073 884 274.

CBM PET BASIC II 32K Ram cassette drive and sound generator unit. Professional keyboard and lots of games and utilities and cassettes and books. Reasonable offers. Tel: 01-803 4733.

30 GAMES FOR CBM 64. £5 for the lot. Tel: 01-948 3916.

VIC 20 BOXED plus 16K Ram, cassette deck. Adventure cartridge, Vic Revealed, Beginners Guide to Basic and various tapes. £150 ono. Tel: Harlow 0279 416138.

CBM 64 S/W. Infocon Adventures. Deadlie, Zork I and Zork II also Atari Defender, Donkey Kong and Robotron £9 each. Tel: 0274 673237.

VIC 20. £130. New selling £95. Tel: 01-598 2869 after 7pm. No offers.

VIC 20 and Tape recorder and Super Expander 16K. Intro to Basic. 5 books, 15 cartridges, and amazing £300 of s/w. Worth £650. Accept £250. Tel: 01-959 3702 evenings Paul.

CBM 64 SOFTWARE for sale or swap, incl. Pilot (Flight Simulator), Grand Master Chess, Wander Adventure game, Hover Bovver, also Printer wanted. Tel: Horsham (0403) 57511.

CBM 64 s/w cartridges, Defender £15. Rat Race £7, Soccer £9, tapes, Forbidden Forest £7, Hobbit £9 and many more. Tel: 0622 61917.

FOR COMMODORE 64, Shinwa CP80 printer with inbuilt interface, one month old. Tractor and friction feed. Excellent quality. £255 complete. Telephone 061 941 3102 Medford.

VIC 20, 16K and Super Expander and motherboard, joystick, cassete unit. Over ten cartridges and 20 cassettes. Books and many magazines, all VGC and still guaranteed. Cost £300 +, want £100 or £120 inc b/w tv. Phone 01-444 9132 (Rick).

For sale

ZX PRINTER paper for sale. £8 gets you five rolls, post paid. Mr C Ritchie, 40 Kelvindale Bldgs, Kelvindale Road, Glasgow. Tel: 041-357 2894.

STONKERS, Mr Wimpy, Jumbly, Death Chase, Pinball Wizard, Thrusta Speed Duel, Scuba Dive, Traxx, Push Off, etc for sale. Phone 061 881 3651 Tony.

PET 4032. Cassette, Paper Tiger Graphics printer, also Cortex hardware, software package allows use as asynchronous mainframe terminal. Lots of software: business, compilers, utilities, assembler, educational, games £500 0634-53556.

CHATTERBOX speech synthesiser £20. No cheques please. Stefan, Flat 2, 1 Station Road, Lytham, Lancs FY8 5DH. First to pay secures. Suitable for Spectrum 16K/48K.

ORIC ATMOS 1 mth old, professional keyboard + £100 of software + £30 cassette unit, spare cassette lead. Software includes Hobbit Redundancy Forces. Sale £250. Will separate. Apply D. Lowe, 36 Mountfields, Pitsea, Basildon, Essex.

T199/4A home computer, perfect condition. 4 months old, plus Parsec game, cartridge, joysticks, beginner's Basic tutor, cassette lead, and 3 good books. £80 ono. Tel: Barnes 741-7824.

ORIC 1 48K complete with books + s/w, 8 months guarantee £80.00. Manchester 061 747 9367.

INTELLIVISION games cartridge, various titles from £8-£16.00 each. Want cartridge for Colecovision System. Tel: 01-764 4075.

ORIC BBC s/w inc: Snooker, Star Ship Command, Planetoid, Snowball, Hobbit, Monster + 8 others. Total cost approx £160. Sell for £80. Tel: Cambridge 862 439.

CURRAH speech unit for any Spectrum, swap for I/O ports or 3ch sound unit or £20 (still under warranty). Tel: (0909) 564719.

MATTEL AQUARIUS 16K Ram pack game cartridge colour and sound. Good condition, still boxed, cost £120. Swap for 48K Spectrum or 48K Oric or sell for £75. Call after 1pm. Newbury (0635) 34520.

MICROLINE 80 Dot Matrix Printer with BBC printer cable. Four months old. Hardly used. Worth £270. Sell for £130. Tel: 0883 42062.

QUICKSHOT JOYSTICK for sale! As new, four months old, perfect working order, uses any Atari type socket, £8. Cheques, PO's to: R. Kidd, 20 Buckfast Close, Ipswich, Suffolk.

LYNX 48K, boxed with manuals, leads, printer interface + £35 s/w. £100.00. Tel: Coventry (0203) 464 732.

48K LYNX, leads, manuals, news letters, s/w £110. Duplicate Ace £30. 2 books for Oric £5.00. Spectrum s/w, games £10. Emigration forces sale. Tel: 0385 731998.

MODERN — da Corn Buzbox. Perfect virtually never used. £55. Tel: 01-794 1899.

TRS 80 model I with Interface 48K with Aculab Strigly floppy or separate £400. Tel:0538 383547 (day) 0538 385538 (ends).

NEWBRAIN AD 32K — £100.00. TRS 80 Green screen monitor £55 ono. Tel: 01-521 0672.

ORIC-I 48K/Oric Atmos software. Brand new games. Four titles. Ghost, Green Toad, Probe-3, Frigate. Never used. Have no Oric! Will swap for Spectrum software or sell £17. 01-385 3645.

48K UPGRADE KIT for sale. Unused, issue 2 only. £15. Phone: Glaasgow, evenings (041) 772-3157. Ask for Peter.

ELECTRON still under guarantee. Boxed. Includes two extra Electron books. £200. No offers. Tel: Wolverhampton 631479.

SHARP MZ80A boxed as new, plus software. £400 ono. Phone Bellshill (0698) 281700 after 6pm.

PROGRAM JOYSTICK Cambridge computing complete with interface and original cassette £18. Tel: Bourne End (06285) 24529.

SELL DRAGON Black Sanctum £5.00. Mansion Adventure one £4.50, Calixto Island £5.00, Dragon Mountain £4.50, Dragon Chess £18.00, Commodore 64, Ring of Power £6.00, Ship of Line £4.00, Knockholt 33170.

PRINTER. Trendcom Thermal Printer. Good working order with interface suitable for CBM/PET. Will swap for something interesting or sell for £45 ono!! (0244) 675717.

8K PET for sale, complete with original Rom, small keyboard, 9" monitor, integral cassette, excellent condition. Any offer. Telephone Maidstone (0622) 38149.

48K ORIC I plus 14 software tapes including Xenon, Galaxians, Oric-Munch etc. Also leads and manual. Cost £260. Will sell for £110 ono. Phone 840 3945.

VIDEOMASTER CHESS champion for sale. Play chess against a computer. 6 levels of play, unwanted gift, worth £80. Will sell for £25. Phone Stevenage (0438) 723958 after 5pm.

CHART FOR J-- S-- W--- only 50p from Fleming, 33 Cromwell Grove, Manchester 19.

ALPHACOM 32 printer. Hardly used. £40. Tel: Oxford 770730.

T199 CARTRIDGES Soccer T. Invaders, Munchman. A pair of TI Joysticks + Hunt the wompurs. £30.00. Tel: 0234 63353 after 6pm.

SHARP MZ80K 48K Epsom MX80 F/T Printer with Interface s/w inc: Crystal Basic + Bug Zen, dissassembler, Forth. £500.00 (might deliver) (0202) 473676.

Wanted

WANTED ACORN Electron up to £150. Tel: 01-478 0206 eves only

OVER 100 Spectrum games to swap. Send SAE with list or Tel: 01-602 2122. Ricky, 112b, Netherwood Rd., London N14.

WANTED MEMBRANE pad for Spectrum Keyboard. Urgent. Tel: 01968 7556 any time.

WANTED SPECTRUM 48K issue II. £70. Alan, Chesham 0494 775810 eves.

WANTED KEMPSTON Joystick Interface or Sviden Interface II. Will give Spectrum s/w Inc The Quill, Zip Zap, Zoom and 3D Tanks. Tel: 01-567 3305. 6-8pm only.

WANTED dedicated cassette recorder for Commodore 64 and appropriate leads. Also wanted Simon's Basic and all accompanying literature. Reasonable price. Phone 061 733 0090 after 4 except Tuesday. Richard.

INTERTON VC 4000 Video computer game. Wish to exchange for Atari 400/800 after 6pm. (021) 748 2418.

WANTED 32K switchable Ram pack for my VIC 20. To swap for two 40 channel C.B. radios. One a.m. and one f.m. worth more than £50. Redhill 69935.

SWAP VIC 20 software Blitz, Ski Run, Nightflite Race, Martian Raider, plus many others including cartridges for any Spectrum software or books. 01-423 5838. Weekends only. Ask for Robert.

SWAP MY Quest of Merravid and Asteroids for the Tombs of Drewan and Wacky Waiters. Ring After 4.00pm any day of the week. Tel: Littlewick Green 2453.

WANTED DRAGON Disc Drive, will swap a GEC Transceiver, which is crystalised for Glider Frequencies 130-4MH, 129-9MH, technical manual included. Worth around £200. Will consider selling. Phone 07368 50478.

WANTED FOR VIC 20 Bewitched. Will swap The Wizard and The Princess for it. Phone Adrian after 5.15 on Banbury 720640.

WANTED 48K Spectrum and manual. No s/w required. Will offer up to £100. Tel: Welwyn 4225. Ask for Joe Kar (after 4pm).

SWAP SHARP MZ80K 48K plus Hi-res and large quantity software for Shinwa CP-80 Matrix Printer (Centronics) and £50. Tel: 889 1090.

SWAP — Casio PB100 P.C. with 1K Ram Pack - boxed as new with Teach Yourself Basic Manual. For any Texas TI199/4A hardware/software (no Arcade). Tel: 0329 286292 after 6pm.

WANTED 48K SPECTRUM with leads and manuals. Will pay between £50-£70. Tel: 01-572 5582.

WANTED DRAGON Hawk or Juniors Revenge in exchange for any of the following, Crazy Painter, Cuthbert, Jungle, Ring of Darkness plus free Planet Invasion. Ian, 3 Birchwood Ave, Middlesbro, CLeveland, TS42XB.

48K SPECTRUM s/w to swap. Spectrum Chess, Dallas, Super Spy to swap for The Quill or any other games designer. Tel: 051 426 7889 after 4pm except on Saturday.

SWAP 40 CHANNEL CB, Mag mount aerial, mike, power pack for 16 or 48K Spectrum. All worth over £80. Tel: after 6pm. 0531-4183 (Herefordshire).

SPECTRUM S/W wanted or to swap for King, Attick Attack, Manic Minor, Snooker, Chukieegg, Football Manager, Jetpac + h/w. Good prices. Please ring Mark McGee at Ray:(770560) for details.

URGENT SWAP or sale! Atari and six cartridges. £69 or swap for any computer (not ZX81). Write or call to Ian Gilligan, 199 Pilch Lane, Dovecot, Liverpool L14 0LD (near Huyton village).

WANTED CASIO VL-Tore (any model). Will swap for brand new ZX81 1K and book and 15. Phone David. Tel: 0555 72175 (after 4.30pm).

EXCHANGE 40CH CB and accessories and metal detector. Both in v.g.c. for 48K issue 2 or 3 Spectrum. Must be in good condition (north west). Tel: 061 797 5760 eves.

KEMPSTON JOYSTICK. I'll swap my Kempston Joystick and interface for ZX Printer. Ring David on (0908) 76247.

SPECTRUM SOFTWARE To swap for ZX Printer: Chess, T/Tower, Intruders, Planetoids, Missile, H. Horace, Androids, Cruising, Jackpot, Sorcerers Castle, Derbyday, Meteor Storm, 30 Tanx Softtalk. Ring Rochdale 50246. After 6pm. Please.

WANTED: Ace user magazines, and adaptor for using ZX81 add-ons on the Jupiter Ace. Tel: Hull (0482) 847279 (evening)

SPECTRUM TAPES Swap: Galaxians, Android One, Horaces, Megapede, Imagines, Orbiter, Cookie, Transam, others. Wanted: Death Chase, Volcanic Planet, Push Off, Thrusta, Harrier, Exterminator, Ostron, Road Racer, Pool, Firebirds. (089 288) 2763.

ORIC SOFTWARE to swap, 20 titles, Arcade, Adventure, Tel: 061 485 6084 after 6pm.

WANTED: MICRO SPEECH. Swap for Computer Battleship (3 years old) or Elecronic Detective. Tel: 0945 582900.

WANTED, DRAGON Speech synthesis or sound extension module, will swap for other software from large selection of cartridges and cassettes. Phone 01-8211710 after 7pm.

SWAP 48K Spectrum 127 games. Programmable Joystick and Interface leads, books, magazines and manual. Mint condition. Boxed. Guaranteed for BBC Model B. In good condition. s/ware not required. Tel: (0908) 564133.

WANTED 48K Spectrum with leads and manuals. Good condition. Software not needed. Will pay between £50-£60. Tel: 061-445 5913.

WANTED MICRO DRIVE + Interface 1. Buy or swap. Large selection software + peripherals. Currah Kempston, Cambridge Interfaces + Quickshot 1+2. 286 5381. After 7pm NW8.

Wanted Sinclair Spectrum 16K/48K. Preferably boxed with leads and manuals. Willing to pay £70.00. Tel: Abertillery 213223 eves (Robert).

ADVENTURE HELPLINE

Micro: *Spectrum 48K*
Adventure: *Escape from Pulsar 7*
Problem: *How do you bake the cake. How do you get the magnetic boots. How do you open the locker?*
Name: *Geoff Marshall*
Address: *69 Adamsrill Road, Sydenham, London SE26 4AJ.*

Micro: *16K Spectrum*
Adventure: *Planet of Death*
Problem: *I cannot get past the force field. I have found the laser gun and typed help on the computer, but simply cannot go not further. Please help me!*
Name: *Gareth Nelson*
Address: *71 Parkinson St, Blackburn, Lancs BB2 4BY.*

Micro: *Vic 20*
Adventure: *Pirate Cove*
Problem: *How do I get past the hungry crocodiles if they don't eat the crackers?*
Name: *I. Wilson*
Address: *8 Claverdale Road, Upper Tulse Hill, London SW2 2DP.*

Micro: *Vic 20*
Adventure: *Adventureland*
Problem: *How do I get past the bear without giving him the honey?*
Name: *I. Wilson*
Address: *8 Claverdale Road, Upper Tulse Hill, London SW2 2DP.*

Micro: *Commodore 64*
Adventure: *The Hobbit*
Problem: *I cannot get through the large trap door in the elvenkings celler. I am always thrown back into the dungeon. Please help me!!!*
Name: *Tim Appleyard*
Address: *453 Chester Road, Woodford, Stockport, Cheshire SK7 1QP*

Micro: *BBC 1B*
Adventure: *Castle of Riddles*
Problem: *Can not get the bucket out of the mud — so as to bail the water out of the small boat*
Name: *Philip Spyrakis*
Address: *2 Downside Rd, Guildford, Surrey GU4 8PH*

COMPUTER SWAP

COMPUTER SWAP

Computer Swap entries are limited to 30 words. Either fill in the accompanying form and send to Computer Swap. *Popular Computing Weekly*, 12-13 Little Newport Street, London WC2R 3LD or telephone 01-437 4343.

All software offered through computer swap must be in original condition and for private sale only.

Warning: It is illegal to advertise pirated software.

Please write your copy in capital letters on the lines below.

Name..

Address..

....

Telephone..

WILD CARDS

Given that its main market has been as a business machine there are fewer filing systems available for the BBC than you'd expect. Of those that are around there are few with anything approaching the sophistication expected from conventional business systems.

Profile from Haiku Soft is one filing system which provides many advanced features. In particular, it allows for fields — the various different elements like name, address, telephone number, etc. — to be of any length. It does not require you to set them up before you start entering data to a regular maximum length — useful because of the often significant saving in memory and the flexibility.

The system also has 'wild cards', where the computer can search for a record even if you are uncertain of an exact spelling or only remember part of a name.

The version of the program supplied on tape will also function on disc and the manual supplied is one of the best I have seen.

Program *Profile*
Price *£19.95*
Micro *BBC*
Supplier *Haiku Software Technology
Dragon Gate,
77 St John's Street
Hayle
Cornwall*

BIT OF BOVVER

I have spoken before of the mysterious Jungian collective consciousness that makes software companies all bring out the same game at the same time.

This phase of the moon is bringing forth versions of that strange arcade game where you must dash across a grid (you being a boot) and stomp on a bomb before it does what all bombs almost inevitably do ie, explode.

As you tread on each section of grid it disappears — so some thought must be given to the best routes to each bomb. There are other features, like skulls and bovver boots to make life even more difficult.

Grid Bomb is the latest version of this game and is for the Oric. It is true to the original and makes good use of the Oric's sound facilities — there are eight screens of action and the whole thing is in machine code. An Atmos version can be confidently expected.

Program *Grid Bomb*
Price *£5.95*
Micro *Oric*
Supplier *Touchstone
61 Highfield Road
Saxilby
Lincoln*

CASH FLOW

Moneybox is a personal finances database program for the Dragon 32. Like most home account type programs it allows a record to be kept of basic financial information — bills, credits, etc.

Unlike other systems, records can be analysed in a great many different ways and past information can be used to produce projections into the future.

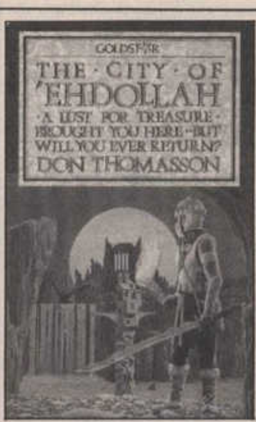
The program is well designed with plenty of prompts and error checking. There are fairly substantial instructions on the cassette insert.

Program *Moneybox*
Price *£9.99*
Micro *Dragon 32*
Supplier *Harris Software
49 Alexandra Road
Hounslow
Middlesex
TW3 4HP*

INGENIOUS

Goldstar is a new software house who clearly do not believe in doing things by halves — all its programs come beautifully packaged in sturdy boxes rather like those for Betamax Video cassettes.

The proof is in the pudding and one of the most interesting of its first releases is an adventure game for the Spectrum called *The City of 'Ehdollah* (you can tell we're among



computing types here). It is text only and retails for a princely £9.95 — for that money it's going to have to be good.

Is it? Well, it does not under stand complicated sentences and an infuriating number of sensible guesses are met with unhelpful 'I don't know how to . . .' type answers.

On the plus side the first few clues I solved proved to have very ingenious but fair solutions and the place descriptions created a convincing backdrop to the fantasy. There is also a facility for real time battles where factors like strength and stamina (largely) determine your success in the various fights. I suspect this is one for the purists who enjoy the pure puzzle solving without fancy trappings.

Program *The City of Eh dollah*
Price *£9.95*
Micro *Spectrum*
Supplier *Goldstar
1-2 Henrietta Street
London
WC2E 8PS*

WITCHCRAFT

Spellbound is one of Beyond Software's latest releases and since it's the one you're likely to hear least of in the coming weeks I thought it worth a mention here.

It's a version of *Q Bert*, (like so many other games released for the Spectrum recently) but instead of a little man with a big nose it has

Pick of the week

CHECK AND MATE



Colossus Chess 2.0 currently holds the reputation as the best chess playing program on any home micro — the manual contains a long list of the other chess programs it has thrashed (*White Knight Mk II* lost 11 to 5).

More than that (for me anyway) it tells you what it is thinking, thus educating you into chess tactics as it goes along. The screen display includes not only the chess board but also chess clocks which is a nice feature I've not seen on other chess programs.

The program contains all the other features of conventional chess programs such as, make best move, change sides, position analysis. The play can take place in any of six modes which differ in their characteristics — some are good for chess problem solving, others for simple games etc.

If you have a Commodore 64 this would seem to be the Chess program to get. The price is reasonable too.

Program *Colossus Chess 2.0*
Price *£9.95*
Micro *Commodore 64*
Supplier *CDS Microsystems
10 Westheld Close
Tickhill
Doncaster
DN11 9LA*

frogs jumping up and down steps trying to escape from the various unnatural and slimy products of a witch's cauldron.

Graphically the game is superb, with large multicoloured graphics — I particularly like the witch whose withered arm zaps additional baddies into existence from time to time.



A couple of small points — the game is not, for some reason, very responsive to joysticks and the movement is a bit jumpy. On the other hand the sound effects are marvellous.

Program *Spellbound*
Price *£5.95*
Micro *Spectrum*
Supplier *Beyond Competition House Farndon Road Market Harborough Leicestershire LE16 9NR*

ASTRO QUEST

Zodiac is the latest Commodore 64 release from Anirog and it is broadly an adventure game in the sense that Ultimate's *Atic Atac* is an adventure game i.e. an arcade game in which you have to complete a task more like that of an adventure i.e. find the twelve symbols of the zodiac scattered around a giant maze.

This involves travelling from room to room avoiding the various different kinds of creature all of whom will kill you without so much as a second glance. Some of the rooms you come across contain the mysterious symbols.

If you collect all twelve symbols then stage two begins. You are transported with the symbols to the Time vaults. Here you meet JEMON (the capital letters mean he is very dangerous indeed) whom you must avoid whilst placing each symbol in the Central Chamber.

Program *Zodiac*
Price *£7.95*
Micro *Commodore 64*
Supplier *Anirog 29 West Hill Dartford Kent*

JUGGLING

Air Traffic Control is a program for the ZX81 which puts you in charge of up to 15 different planes all flying in the same area of sky.

Your task, like juggling with several balls at the same time,



is to make sure all the aeroplanes don't crash by keeping them on separate paths from one another.

In the unlikely event that this all sounds easy, the whole matter is complicated by all the planes flying at different rates and by the extra requirement that you send them all safely off from your area in the right direction for their destinations.

Program *Air Traffic Control*
Price *£4.95*
Micro *ZX81*
Supplier *Hama Software Sackville Place 44-48 Magdalen Street Norwich*

MICRO MUSIC

Now you can use your Spectrum to learn guitar (since playing music is often a lot more satisfying than playing computer games it could put itself out of a job) with *Guitar Tutor 1* from Harlequin software.

The program is divided into three parts, an introduction and tuning guide, a display of the most common chords, and four tunes for you to play and impress your friends.

Obviously the big problem with the Spectrum and to a lesser extent the other micros is that you cannot use it to play chords. That said though, complete beginners could get something from this program.

Program *Guitar Tutor 1*
Price *£4.95*
Micro *Spectrum*
Supplier *Harlequin Software 43 Osprey Park Thornbury Bristol BS12 1LY*

PARASITES

Digger is a sort of *Dig Dug* for the BBC B. Your carefully nurtured allotment is attacked by waves of footas and pubars, particularly nasty forms of parasite.

You can defeat them by pumping them up — an unpleasant form of revenge in which they explode like baloons, or you can drop rocks on them by careful tunnelling.



Not that you have things your own way all the time, on some occasions the baddies turn into fire breathing ghosts with a sideline in gamma rays.

The whole game is machine coded with nicely animated characters and good sound effects.

Program *Digger*
Price *£6.90*
Micro *BBC B*
Supplier *Visions 1 Felgate Mews Studland Street London W6 9JT*

SODA SQUIRTS

The Pyramid from Fantasy Software was a game noted not only for its quality but also its quantity — 120 different rooms containing 120 different aliens.

The game is now available on the Commodore 64 and all the features of the Spectrum original have been retained including such masterly inventions as the dreaded squirting soda syphons (the programmers obviously go to the same sort of parties as I do) and the extra-terrestrial tweezers.

The order of alien encounter depends on how you leave each previous room ie, N,S,E, W. All the aliens animate appropriately eg, tweezers tweek, syphons squirt, etc. Apart from that it's pretty much dodging and destroying all the way. One extra touch — it sets up a title page whilst loading, which itself is speeded up considerably — features all 64 games should have as the inscrutable blue screen gets pretty irritating.

Program *The Pyramid*
Price *£6.50*
Micro *Commodore 64*
Supplier *Fantasy Software Fauconberg Lodge 27A St Georges Road Cheltenham Glos GL50 3DT*

New Releases is designed to let people know what software is coming on to the market. If you have a new game or utility which you are about to release send a copy and accompanying details to: New Releases, Popular Computing Weekly, 12-13 Little Newport Street, WC2R 3LD.

Top 10

BBC*

1 (1) Mr Wimpy (Ocean)
2 (3) Fortress (Pace)
3 (4) Daredevil Dennis (Visions)
4 (2) Chuckie Egg (A&F)
5 (8) 3D Space Ranger (Microbyte)
6 (—) Twin Kingdom Valley (Bug Byte)
7 (—) Snooker (Visions)
8 (—) Legion (Software Projects)
9 (10) Saloon Sally (Psion)
10 (9) Cosmic Kid (Superior)

*All model B
(Figures compiled by Micro Management, Ipswich p473 59181)

Atari

1 (2) Warlock (Calisto)
2 (1) Rally Speedway (Adventure International)*
3 (4) Slinky (Cosmi)
4 (5) Caverns of Kafka (Cosmi)
5 (—) Fire Fleet (English)
6 (—) Voodoo Castle (Adventure International)‡
7 (7) Preppie (Adventure International)
8 (—) Enchanter (Infocom)†
9 (3) Saga 5 The Count (Adventure International)†
10 (—) Planet Fall (Infocom)†

*Cartride †32K disc ‡32 cassette
(Figures compiled by Calisto Computers, Birmingham 021 632 6458)

Spectrum*

1 (5) Atic Atac (Ultimate)
2 (—) Jet Set Willy (Software Projects)
3 (1) Chequered Flag (Psion)
4 (7) Scuba Dive (Durell)
5 (3) Hunchback (Ocean)
6 (8) Flight Simulation (Psion)
7 (—) Pogo (Ocean)
8 (9) Lunar Jetman (Ultimate)
9 (6) Cyrus is Chess (Intelligent)†
10 (2) Ant Attack (Quicksilva)

*All 48K except where noted. †16K
(Figures compiled by WH Smith and Son, London

Commodore 64

1 (5) Manic Miner (Software Projects)
2 (—) Quick Thinking (Mirrorsoft)
3 (—) Caesar the Cat (Mirrorsoft)
4 (—) Hunchback (Ocean)
5 (3) Revenge of the Mutant Camels (Llamsoft)
6 (8) Mr Wimpy (Ocean)
7 (—) Space Pilot (Anirog)
8 (—) Ugh (Softek)
9 (10) International Football (Commodore)
10 (2) Boogaboo (The Flea) (Quicksilva)

(Figures compiled by Boots/Websters)

Vic 20

1 (1) Snooker (Visions)
2 (4) Flight 015 (Ferranti Davenport)
3 (3) Wizard and the Princess (Melbourne House)
4 (–) Metagalactic Llamas Battle at the Edge (Llamasoft)
5 (2) Krazy Kong (Interceptor)
6 (5) Jet Pac (Ultimate)
7 (–) Emmet Attack (Commodore)
8 (6) Grid Runner (Llamasoft)
9 (–) Carrier Attack (Rabbit)
10 (–) Dambuster (Rabbit)

ZX81★

1 (1) Mothership (Softsynch)
2 (3) Fantasy Games (Psion)
3 (5) Space Raiders (Psion)
4 (6) Asteroids (Quicksilva)
5 (9) Football Manager (Addictive Games)
5 (4) Flight Simulation (Psion)
7 (7) Scramble (Quicksilva)
8 (–) Invaders (Quicksilva)
9 (10) Defenders (Quicksilva)
10 (9) Vu-file (Sinclair)

(Two titles tied for fifth position)
★ All 16K

Dragon

1 (9) Dragon Chess (Oasis)
2 (–) Ugh (Softek)
3 (4) Hungry Horace (Melbourne House)
4 (1) Chuckie Egg (A&F)
5 (8) Kriegspiel (Beyond)
6 (3) Pedro (Imagine)
7 (2) Up Periscope (Beyond)
8 (–) Space Shuttle Simulator (Microdeal)
9 (5) Devil Assault (Microdeal)
10 (–) Cuthbert in the Mines (Microdeal)

Books

1 (4) Disc Systems for the BBC Micro, *Sinclair* (Granada)
2 (2) Mastering the Commodore 64, *Jones and Carpenter* (Horwood)
3 (1) Interfacing Projects for the BBC Micro, *Smith* (Addison Wesley)
4 (—) A Hardware Guide for the BBC Micro, *Derrick* (Wise Owl)
5 (6) Introducing Logo, *Allan* (Granada)
6 (5) BBC Micro Disc Companion, *Latham* (Prentice-Hall)
7 (3) Advanced Graphics with the BBC Microcomputer, *Angell and Jones* (Macmillan)
8 (9) 68000 Assembly Language Programming, *Kane and Leverthal* (Osborne)
9 (—) MS-DOS Users Guide, *De Voney* *(Que)*
10 (8) Complete Forth, Winfield (Sigma)

(Figures compiled by Watford Technical Books, Watford (0923) 23324 Prestel 28844)
(Last week's position in brackets)

Book Ends

SOUPED-UP

Machine Code for the Atmos and Oric 1 is a timely book for those who have recently bought the new souped-up machine.

Of introductions to machine code there is little to say — loops, hex, instruction codes, and the rest are introduced and explained.

The book makes much use of flow charts and examples (which look suspiciously as though they were type set — very worrying from a reliability point of view). The writing from Bruce Smith is clear and, although I always think machine code is a lot more difficult than book blub would have you believe, quite easy to understand.

Book *Machine Code for the Atmos and Oric-1*
Price *£6.95*
Micro *Oric 1/Atmos*
Supplier *Shiva Publishing, 4 Church Lane, Nantwich, Cheshire CW5 5RQ*

XY PLOTTER

Interfacing Projects for the Micro is one of the most interesting computer books I've seen. As the title suggests it contains various ideas to connect your micro to the outside world. These include a light pen, a rain detector and more impressively, an Eprom programmer and an XY plotter.

The real achievement of the book is it's very clear descriptions of what to buy and how to commect it all together, with a photo of what the device should look like. Even a complete electrical illiterate should find nothing daunting here.

Book *Interfacing Projects for the BBC Micro*
Price *£6.95*
Micro *BBC*
Supplier *Addison-Wesley, 53 Bedford Square, London WC1*

This Week

Program	Type	Micro	Price	Supplier
Gamestape	Arc	Aquarius	£5.95	Fawkes
Smack	Arc	Atari	£8.95	Future Design
3D Tankzone	Arc	BBC	£8.95	Dynabyte
Advanced Basic	Ed	BBC	£10.50	Honeyfold
Assembled Language	Ed	BBC	£12.50	Honeyfold
B Base	Ut	BBC	£25.00	Clares
The Alien Planet	Ad	BBC	£9.95	Honeyfold
Acos+	Ut	Commodore 64	£8.95	Melbourne House
Assembly Language	Ed	Commodore 64	£12.50	Honeyfold
Basic Programming	Ed	Commodore 64	£10.50	Honeyfold
Cosmic Cruiser	Arc	Commodore 64	£5.50	Imagine
Cuthbert goes Walkabout	Arc	Commodore 64	£8.00	Microdeal
Cuthbert in Space	Arc	Commodore 64	£8.00	Microdeal
Cuthbert in the Jungle	Arc	Commodore 64	£8.00	Microdeal
Death Star	Arc	Commodore 64	£5.99	Rabbit
Mazlacs	Arc	Commodore 64	£6.95	DK Tronics
The Alien Planet	Ad	Commodore 64	£9.95	Honeyfold
Ace High (MK 2)	Arc	Dragon	£6.95	Tudor
Crazi Plumber	Arc	Dragon	£6.95	Wizard
Decathlon	S	Dragon	£5.95	Wizard
Dodo	Arc	Dragon	£5.95	Blaby
Elimast	Ut	Dragon	£19.95	Microdeal
Juniper	Ut	Dragon	£9.99	Juniper
Mission XK1	Arc	Dragon	£6.95	J Morrison
Planet Conquest	Arc	Dragon	£5.95	Blaby
Starword	S	Dragon	£5.95	Wizard
Strategy	S	Dragon	£8.45	Wizard
The Chocolate Factory	S	Dragon	£6.95	Minits
Sunken City	Ad	Dragon 32	£7.95	Silk
Assembly Language	Ed	Electron	£12.50	Honeyfold
Bridge Player II	S	Spectrum	£8.95	CP Software
Basic Programming	Ed	Spectrum	£10.50	Honeyfold
Count with Oliver	Ed	Spectrum	£7.95	Mirrorsoft
Empires	S	Spectrum	£19.95	Imperial
Engine Collectors	Ut	Spectrum	£3.45	Placet
Forth	Ut	Spectrum	£15.00	Sigma
Halley's Comet	S	Spectrum	£7.45	Eclipse
Look Sharp	Ed	Spectrum	£7.95	Mirrorsoft
Matrix	Arc	Spectrum	£6.95	Salamander
Messier List	S	Spectrum	£6.45	Eclipse
Olympics 84	Ut	Spectrum	£14.95	Storm
Psi-Spy	Ad	Spectrum	£7.95	Postern
Alpha Blaster	Arc	Vic 20	£7.95	Sumlock
Assembly Language	Ed	Vic 20	£12.50	Honeyfold
The Alien Planet	Ad	Vic 20	£12.50	Honeyfold
Climber	Arc	ZX81	£4.45	Microdeal
The Temple	Ad	ZX81	£2.85	J Paton

Key: **Ad** — adventure/**Arc** — arcade/**Ed** — education/
S — strategy-simulation/**Ut** — utility

This Week is a new section that covers all the new software coming on to the home micro market each week. All suppliers should send details of their new programs to: This Week, Popular Computing Weekly, 12-13 Little Newport Street, London WC2R 3LD.

Ziggurat



The outer limits

I dropped out of hyperspace, my guts returning to their familiar positions — hyperspace always leaves me feeling nauseous. I flipped the toggle switch controlling the window shields, the mechanisms hissed within the skin of the ship and space flooded in through the giant window which covered the starboard wall of the control cabin.

At the sight of this deep blackness at the edge of the galaxy vertigo gripped me in its crazy fingers for a moment and my throat crawled like the fur on the back of a cat. I shook my head and swung back round to examine the readout screens in front of me.

"Bleak out there," Neep said inside my ear. I looked over to the wall bracket where he had attached himself for the duration of the voyage. Neep, a small Psuedo Conscious Intelligent Construct and my companion for the past year, communicated with me by means of a receiver/speaker implanted in my ear and a transmitter/microphone implanted in my throat.

"Yes, it scares me this far out, yet I find it exhilarating," I subvocalised. The cabin remained quiet. "Are you monitoring the displays over here?"

"Yes, looks as though that cry for help was no hoax," Neep whispered in my ear. I turned to look out of the wall window and space silently exploded, blinding me for a moment.

"What the . . ." I swore loudly. Then my training asserted itself and I started to subvocalise to Neep, "Find out what that was; take control of ship systems; move us out of here; evasive manouveurs; if necessary, vector us through the nearest gravity well into H-Space." As I spoke, the first reports appeared inside my ear.

"Warning/attack shot, vessels beyond the Forts of Falnon; refer to navcom screen; Missile type unknown; vessels unknown. Evasive manouveuring complete. Ship intact. Scans indicate missile pattern converging. Strap down Aereus, this is going to be rough, Main Sub Light Drive engaging. Ignition. Gravity Inertia Compensation .7 effective and falling." I ripped the webbed straps from their hooks and pulled them tight over my body as the ship, a Calurian Cannon ship named Hawk, plummeted sideways through space. As the Gravity Compensation began to fail, I felt myself falling towards the wall window.

"Neep, your control," I gasped as madness forced my consciousness away from my brain and down my spine.

Light shimmered down a long tunnel peopled with chattering harpies as I clawed my way back to consciousness. "Aereus, are you back?"

"Neep, How long?"

"Three minutes, that was a bad one."

"Report?" My head felt like the inside of an incinerator.

"I've carried out evasive action, we are at a safe distance for the moment. You really must get something done about that agoraphobia. I've put the Hawk through some tough manoueveurs, the structural integrity is down to .66, and we have no H-Space facilities, we'd break up on entry. The alien fleet . . ."

"The what?" I asked — this was getting a little too hairy.

"Alien fleet. Forty aggressive ships of unknown origin and capabilities beyond the Forts of Falnon. The Forts will not be functioning again as defence and refuelling stations — they have suffered severe damage. There may be no one left alive on them. Look at the Shipcom screen for a rerun of some pictures I took while we moved."

I looked down at the screen before me and my hands went cold. Sweat broke out on my forhead, dripping into my eyes. The scene was of the nearest fort, a huge grey brown solid H shaped structure, a shadow between me and a mean scattering of stars. There were gaping holes in it, as though some improbable monster had taken bites out of it, and shards of metal drifted around the Fort rotating slowly.

The the camera zoomed in on the docking bay; the doors were open and I could see some debris floating around them. Closer now I could see bodies adrift in the bay, the inner hatchways were gaping wide, a little frozen air was smeared on the doors, a helmeted figure crossed the screen, the visor red, a rip in the side of the suit trailed a string of frozen meat.

"Neep, I've seen enough, the distress call that brought us here, is it still sounding?"

Mark Eyles

To be continued next week

Puzzle

Throw the dice

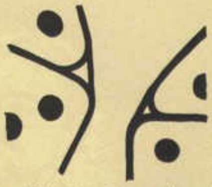
Puzzle No 104

It was a rainy day and time to amuse ourselves with a set of dice.

"Pick two numbers between 2 and 252 — that's the limit of the game," they said.

"Sixty-seven and one hundred and ninety-nine," I said.

"Now pick up and shake the four dice, and throw two of them on the table," they continued. I did as they requested.



"Now, multiply the two numbers together, throw the third die and *add* this number thrown." Having done this, they instructed me to throw the fourth dice, and finally *multiply* by this number.

To win the game, this final total should be equal to one of the numbers chosen at the outset.

It was only later that I realised that perhaps I had made the wrong choice of numbers. What numbers should I have picked?

Solution to Puzzle No 99

The problem can be solved by breaking down each even number (2 to 100) into component primes, or, as here, by summing together every odd prime with every higher odd prime, and incrementing an array, by one, for every total under 100.

The odd primes under 100 are held in a second array, P(25). Lines 30 to 54 put the first 25 odd primes into P(1) to P(25).

```
10 DIM A (50) 20 DIM P(25) 30 LET P(1) = 1 31 LET P(2) = 3 54 LET P(25) = 97 60 FOR N = 1 TO 24 70 FOR M = N TO 25 80 LET S = P(N) + P(M) 90 IF S <= 100 THEN LET A(S/2) = A(S/2) + 1 100 IF S> 100 THEN GOTO 120 110 NEXT M 120 NEXT N 130 FOR N = 1 TO 50 140 PRINT N * 2, A(N) 150 NEXT N
```

This shows that there are *ten* possible different prime pairs which can be added to form the number 90.

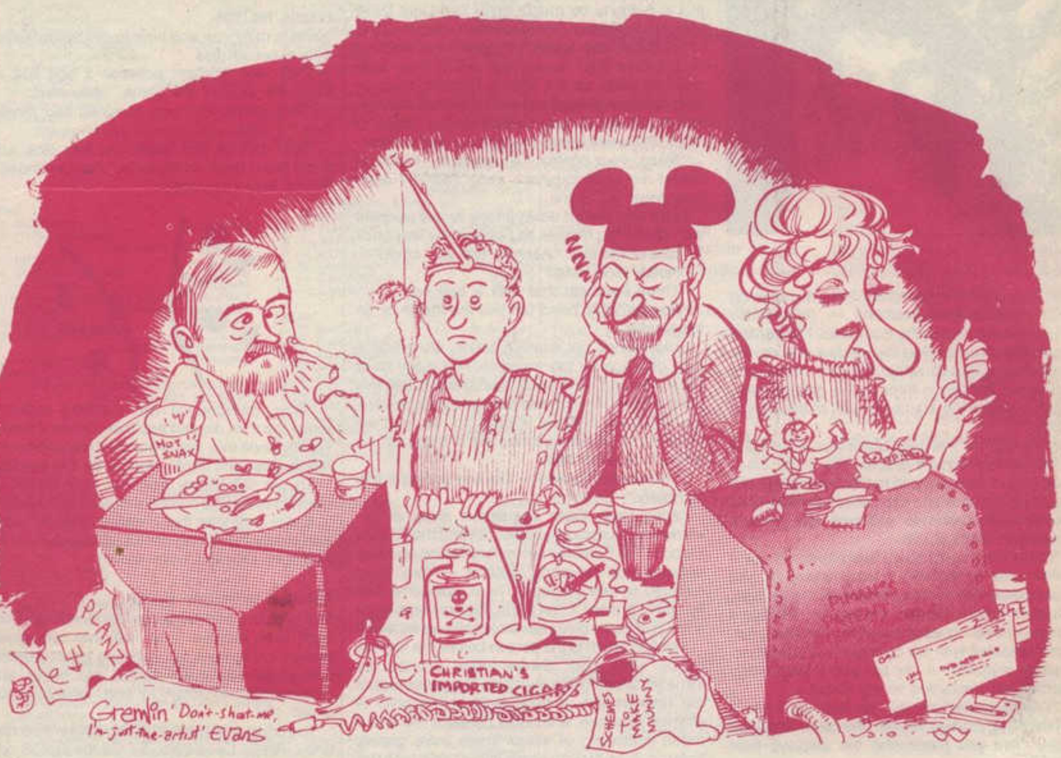
Winner of Puzzle No 99

The winner is: Iain David Sibley, Neuadd Philip-Evans, The Polytechnic of Wales, Pontypridd, Mid Glamorgan, who receives £10.

The Hackers



IMAGINE HAVING TO WORK LIKE THIS !



PROBATION REPORT

It was only a few shorts ago that (from top to bottom) Mel Fagin, Andy Stagg Beetle, Christian-the-Walking-Pillowcase and Lady Clair Sinclive were asked to change their briefs ... "to produce the 69 most unacceptable programs ever."
The tension is beginning to show; their once smiling faces are still smiling, their eyes remain gently closed, Beer and Vodka are beginning to take their dole.
The atmosphere up 'Automata Towers' is a gas; will they suck seed? Can they maintain their insanity? Will they crack under the mental boredom?
Rumours abound that these programs are original, entertaining and value for money... no chance!
CAN YOU CONTAIN YOUR PATIENTS?

CONSUMABLES TO DATE

Coffee consumed 0 cups (Coffilta reposessed the coffee machine)
Entire overdraft facility 1
Telephones tapped 353½ (our chief salesman didn't like one of his)

AUTOMATA one of our games is both the same

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.... but seriously, **AUTOMATA**

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